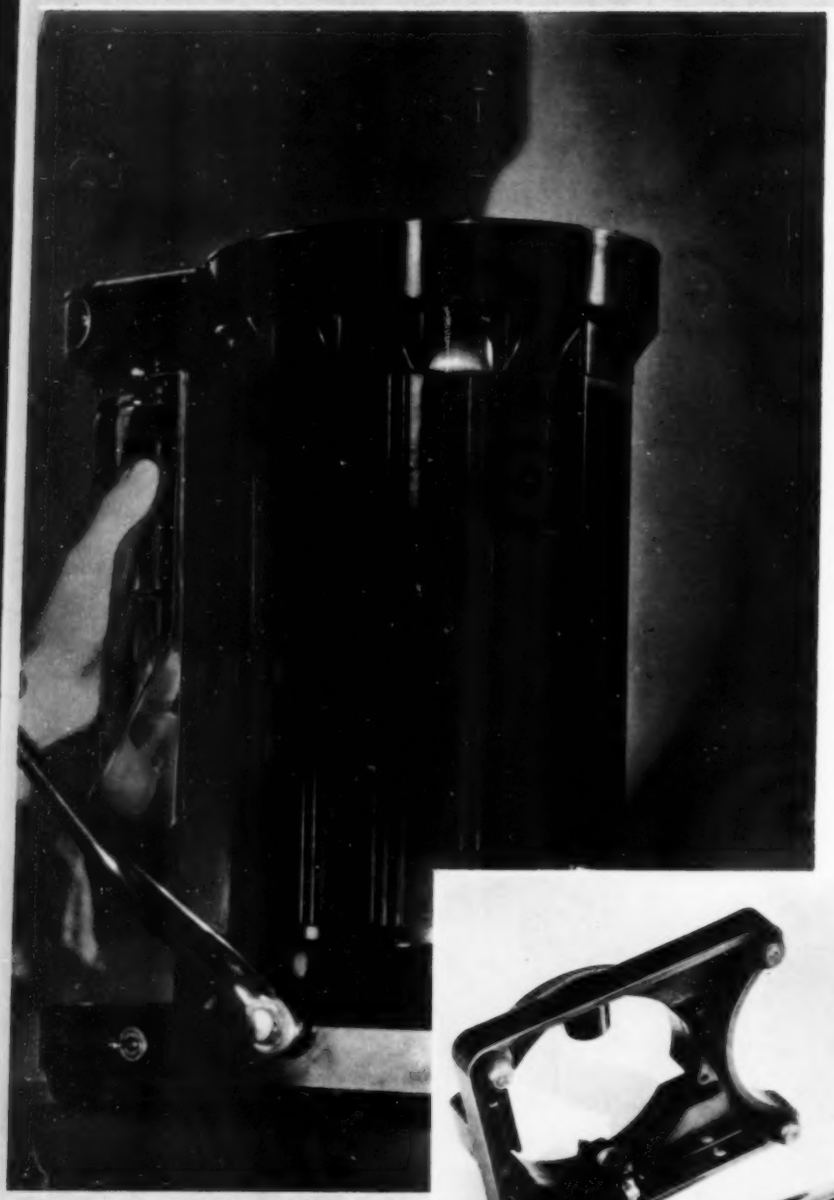
MODERN PLASTICS

MARCH 1935

Entire housing for largest, fastest mixer . .

MOLDED OF DUREZ



The new Andis Speedwhip does a thorough mixing job at the fountain in five or six seconds . . . 1/4 the time of the average machine now in use. With such speed, made possible by the use of a 1/6 h. p. motor, the new Andis can take the place of a whole battery of ordinary mixers.

Mixing is done in a sealed chamber, with a double-blade agitator throwing the ingredients against a baffle. Ingredients are crushed between the revolving agitator and the baffle.

—comes out of mold complete with oil-less bearings metal inserts and permanent finish

The housing for the new Andis Speedwhip is one of the largest and most difficult molding jobs ever done. Sound design and engineering by American Recor Corporation has made the molding of these large pieces practical. They chose uniform dependable Durez for the job and produced the most attractive durable, economical chassis and housing possible.

The entire housing is produced in three molds complete with metal inserts for gears, switch and switch control arm. Oil-less bearings for the driving gears are molded right into the top section. No finishing is necessary . . . the smooth Durez surface needs no polishing or buffing after it comes from the mold—a saving in production operations which lowers the cost of the unit. Durez' structural strength stands up perfectly under the vibration of the powerful 1/6 h. p. motor. Its dielectric strength makes other insulation of the switches and motor unnecessary.

No matter what you make, you should be familiar with this versatile material. Write (telling us what you make) for booklet "20 Applications" and suggestions on improving your product with Durez. General Plastics, Inc., 353 Walck Road, North Tonawanda, N. Y.

★

YOU CAN DO IT BETTER WITH

DUREZ

THE MODERN MOLDING COMPOUND

★

VOLUME TWELVE NUMBER SEVEN

MARCH 1935

MODERN PLASTICS

WITH WHICH IS COMBINED PLASTIC PRODUCTS

Cast Phenolics for Theater Architecture 11
By Eva Nordness

From Old to New with Lurelle Guild 14
By E. F. Lougee

Design for Black 16
By Franklin E. Brill

New Ideas 18

Printed Paper Now Molded into Box Covers 19

Molded Motor Housings Pass "Torture" Tests 20

Combining Materials 22
By Robert L. Davis

Plastics—The Future and the Chemist 25
By John T. Stearn

New Fields to Plow 26
By E. F. Lougee

The Sampling Principle 28
By Ruth Lampland

The Clock Points the Way to the Decorator 29

Rising Sales Greet Increasing Use of Plastics 30

Plastic Users Look Forward to Dual Spring Exhibits 32

Practical Plastics Score Over Wood 36
By Gardiner Voss

New Books 38

News 39

Plastics' Stake in Simplification—Standardization 48
By Waldon Fawcett

New Molded Figuring Machine Case 49

Which Plastics to Choose? VII. Miscellaneous Plastics 50

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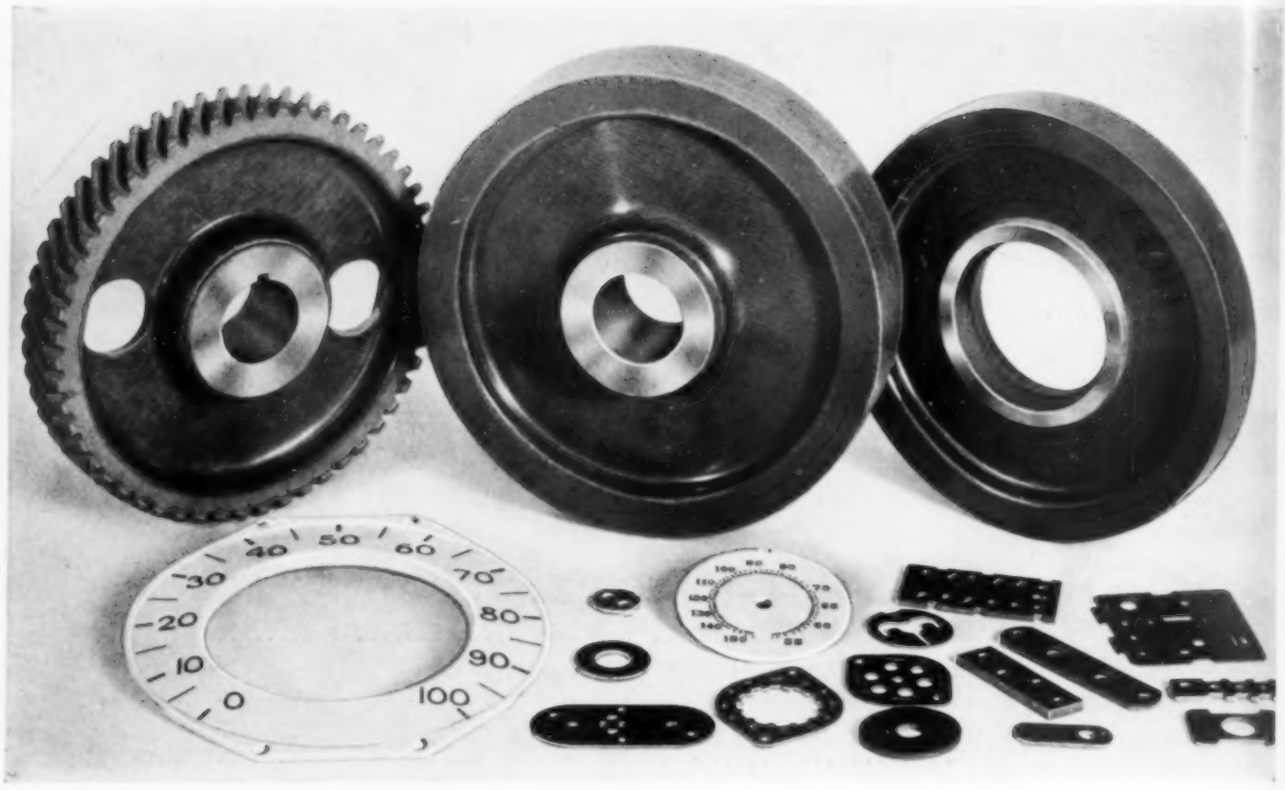

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MODERN PLASTICS

BRESKIN AND CHARLTON PUBLISHING CORP.
MARCH, 1935 VOL. 12, NO. 7

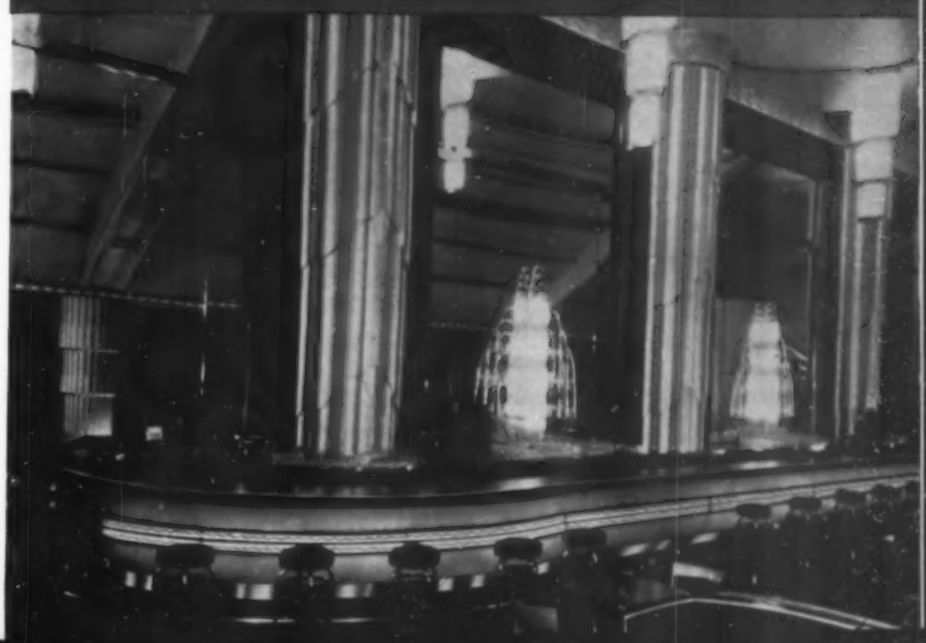
CAST PHENOLICS AS DECORATIVE MATERIALS FOR THEATER ARCHITECTURE

by Eva Nordness

THE question of the utility and adaptability of cast phenolics to interior and exterior decorative problems in theater and night club architecture is brought up by the startling, original and unusually effective uses of Catalin, a cast phenolic, in the decoration of New York's newest theater-night club, the "French Casino" of New York.

This "theater-night club," if we may call it that, is the most recently built entertainment spot on the Great White Way constructed in a building formerly used exclusively as a theater. It follows in the train of several such spots, all of which took their cue from Billy Rose's "Casino de Paree," opened in the fall of 1933 in the old New Yorker Theater on West 54th Street.

The theory back of the adaptation of these theater buildings to night clubs seems fundamentally sound. The sight of dancers on the floor, moving in rhythm to sinuous music against varicolored backgrounds, has always been an important part of a night club's entertainment for those who are not dancing at the time or for those who come to dine and merely to watch the dancers and listen to the music. Where a night club has a floor show in addition to the regular dancing, a stage is nearly imperative if the acts are to be easily seen and properly appreciated. Then why not use the stage of an unused theater as the setting for the floor show, with the orchestra either on the stage at one side (as at the French Casino) or in the pit, or in the boxes at either side (if two orchestras are used, as at the Casino de Paree)? And why not use the stage as the dance floor, a perfect setting for the dinner entertain-



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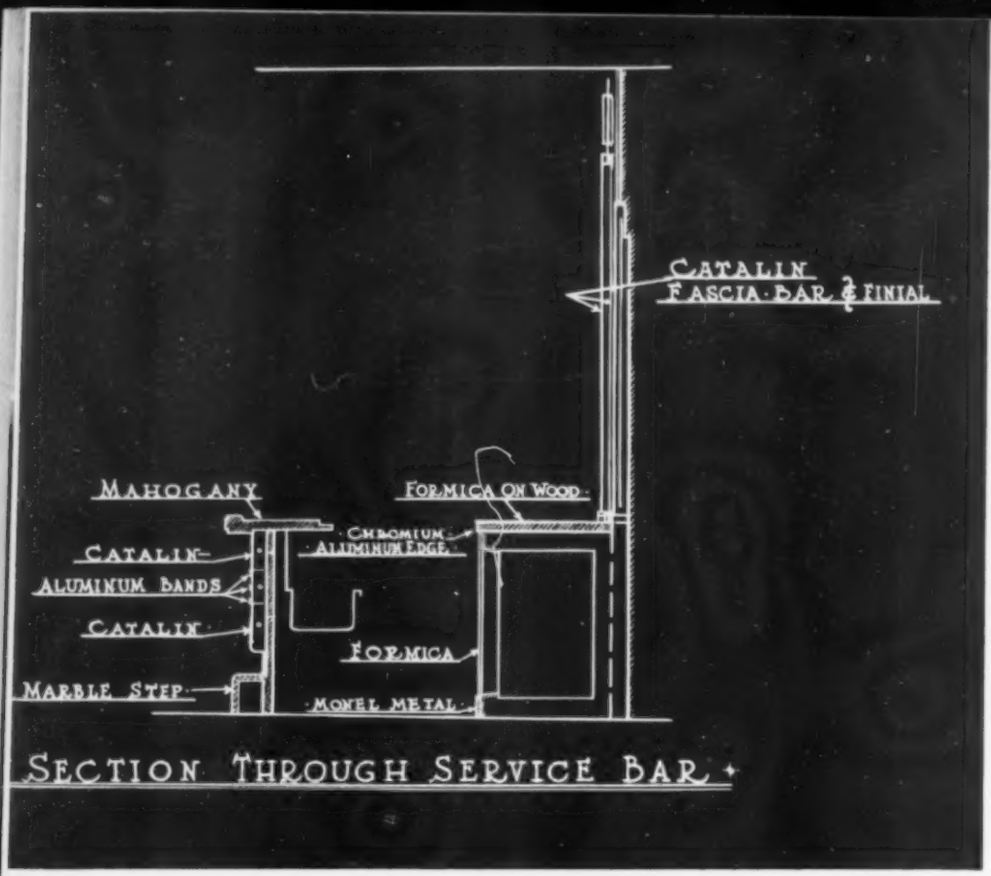
Setting the tone for the public rooms of the French Casino, these two bars introduce cast phenolics as a novel yet practical decorative material



Left: Diagram of the Service Bar, showing the method of utilizing the cast material. Right: The marquis of the Theatre-night-club showing the interesting effects achieved in exterior utilization of phenolic castings

★

When the firm of Thomas W. Lamb, Inc., undertook the "transformation" of the Earl Carroll Theater, they investigated all available materials so as to create the desired novel effects. In their search, they contacted the Neon Division of the American Catalin Corporation and adopted Catalin cast phenolics for some rather striking applications, although hitherto this type of material was not applied to theater decoration.

Catalin supplanted glass in many cases, for several reasons. First, for the illuminated sign on the outside of the building, colored glass was more expensive to make in a complicated, varicolored pattern, more difficult to ship (with possible delays in deliveries where curved surfaces had to be shipped and might possibly be chipped or broken), and more uncertain to use in every way. Then, for the bars (there are two of them in the French Casino—one 21′ and the other 50′ long) where long pieces of material in red had to be shipped after being specially cast, and where curved ends for the bar had to be packed and specially transported from the factory, the item of delay and possibly of mishap to the fragile glass put glass out of the running and gave the tougher cast phenolics the lead. And then, in the lighting fixtures, used both at the entrance to the balcony and as vertical decorations along the outside of the balcony, a material more translucent than glass and yet just as colorful, had to be used.

Of course, there are still some extremely effective uses of glass in the French Casino. The looped transparent tube glass decoration against the fascia of the Marionette Bar on the Mezzanine is a conspicuous exception. Yet we are of the opinion that if that decoration, too, had been cast of a phenolic resin, it would have been more effective and more in keeping with the body of the bar, which is made entirely of red cast phenolic resin, banded with three parallel narrow stripes of chromium around the center.

How, specifically, did Thomas W. Lamb, Inc., install bars and fixtures of cast phenolics? What colors were used? What means of indirect lighting?

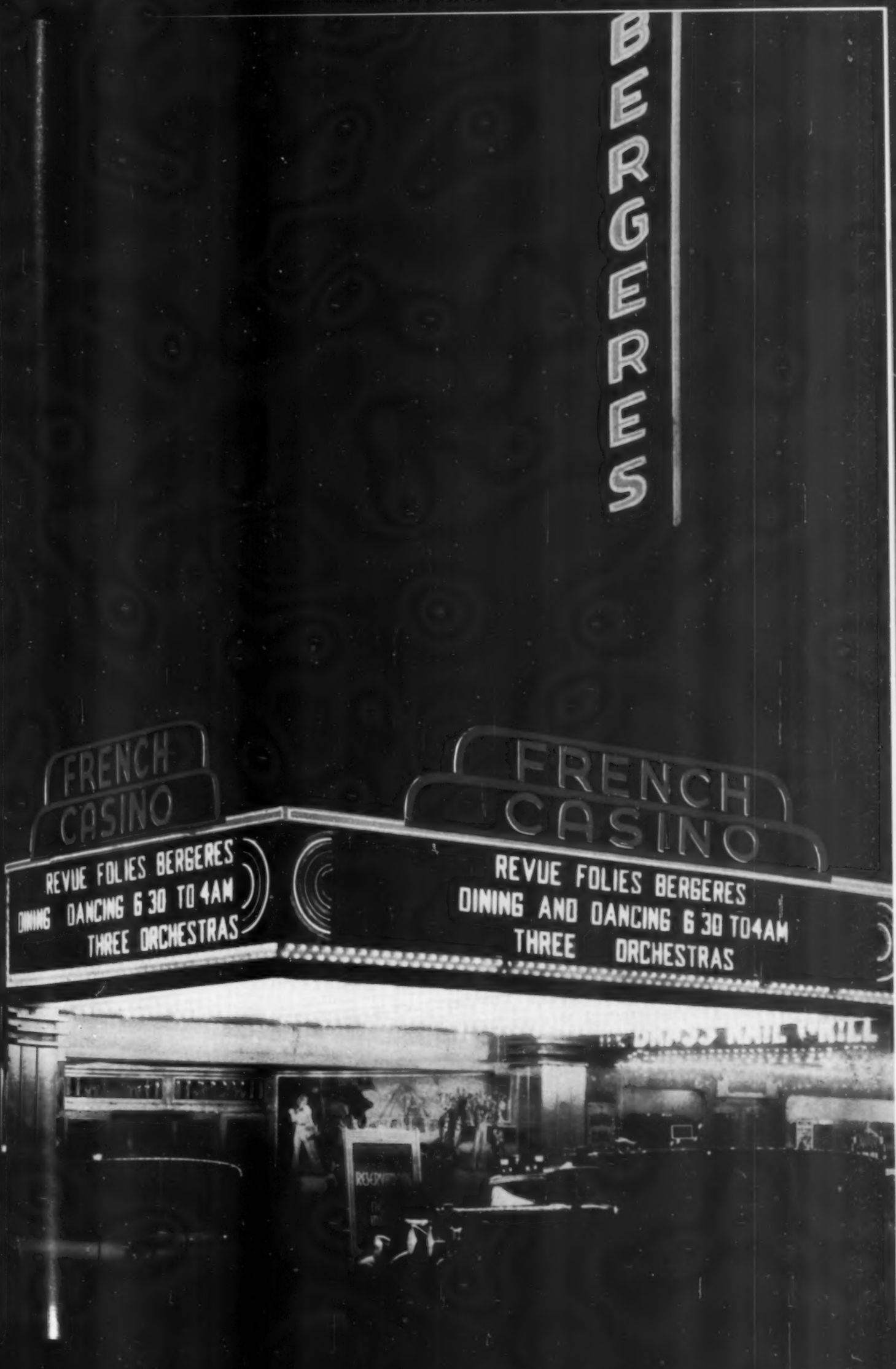
The twenty-one foot scarlet bar, in the entrance lobby just to the left of the doors as one comes in, is made of Catalin entirely. (*Continued on page 46*)

ment, a much roomier place than the average small enclosure provided for dancing in typical New York night clubs? A setting for the dancers is easily provided on the stage by lowering a back-drop of shimmering metallic cloth, on which spotlights of various colors create a myriad of color effects. Or a curtain of any one of a dozen different styles will create as many desired effects.

The construction of the night club out of a theater structure is not difficult. Fundamentally, there is the problem of widening the tiers of the orchestra floor so that they will hold tables for two, four or even six or eight after the orchestra seats have been removed. Then there is the problem of making access to the balcony more easy, to lure dancers to sit up there for dinner or refreshments while watching the floor show. And there are accessory problems as to what to do with the lobby, the balcony foyer, and the stairways to make the air of the place that of a night club and not that of a legitimate theater.

Color plays an important part in this re-construction or "face lifting." Color, particularly in the lobbies, where people must be encouraged to linger rather than to go quickly through into the body of the theater. Color in the lighting fixtures. Color in the decoration of the balcony. And light and color to enhance the effect of spaciousness. To create a greater effect of liveliness and gaiety.

Color, also, in the sign outside the building. This sign, replacing the usual theater marquee or at least standing high above it, must be colorful enough to give an index to the character of the place, and novel enough to create a distinct impression among the myriads of signs in red neon and in white lights along Broadway's "White Way."


BERGERES
FRENCH CASINO
REVUE FOLIES BERGERES
DINING DANCING 6 30 TO 4AM
THREE ORCHESTRAS
FRENCH CASINO
REVUE FOLIES BERGERES
DINING AND DANCING 6 30 TO4AM
THREE ORCHESTRAS

LURELLE Van Arsdale Guild, author of "Geography of American Antiques" and more than 200 other articles and books, mostly on the subject of the American home, is a native New Yorker, and graduate of Syracuse University. During his term in college he became editor of two college papers and at graduation time decided he wanted to write and illustrate for a livelihood. He began with articles for women's magazines and, with his natural and trained ability to illustrate his own articles, soon found himself illustrating and designing interiors for Ladies Home Journal, Delineator, Women's Home Companion, McCall's, House and Garden and others. At about this time he developed a strong affection for antiques which are still his dominating hobby.

In 1926 the urge to create things as well as illustrate them became so strong that he entered the field of industrial designing where he has given original line and form to thousands of objects, increasing their beauty and utility, and therefore their sales as well. His first design was a tombstone and from that dreary beginning he has successfully developed linoleums, rugs, washing machines, mixing machines, all sorts of kitchen utensils, table glassware, garden, porch and living room furniture, silverware, refrigerators, oil burners, bathroom fixtures and furniture, vacuum cleaners and kitchen stoves, as well as a streamlined locomotive, a trolley car and a Pullman coach. Right now, he is working on a new typewriter and an air conditioner and is rated among the most active designers.

FROM OLD TO NEW WITH LURELLE GUILD

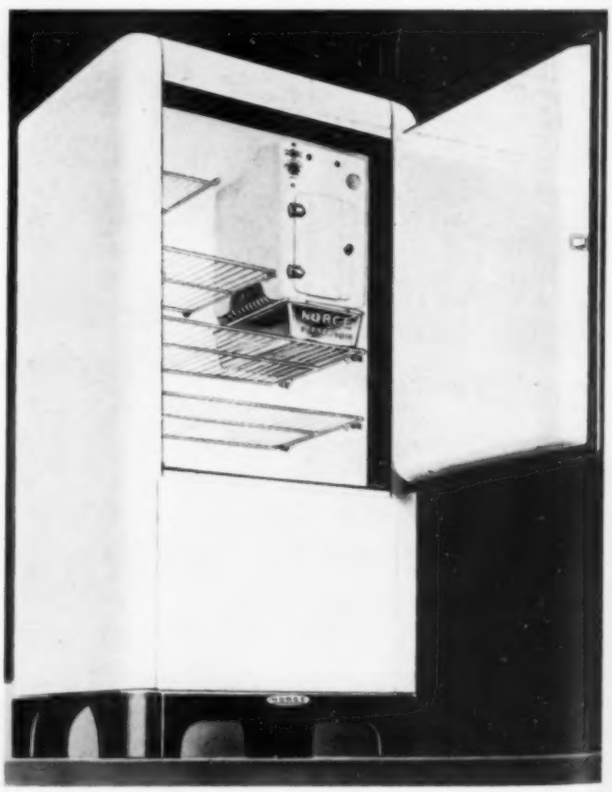
An interview by E. F. Lougee

"PLASTICS," says Lurelle Guild, "offer amazing possibilities to both designer and manufacturer in tricking up design. A change of texture is essential to good design, and no other material is as versatile nor as flexible as phenolics and ureas in their various forms. Furthermore, the insulating qualities of plastics and their resistance to heat make them indispensable in the manufacture of modern kitchen equipment and their use in that capacity increases the life and utility of the utensil in definite ways. The finish never changes. It never wears out. It never gets too hot, if the utensil is properly designed, to handle with comfort. And, as a decorative note, plastics have no equal."

Mr. Guild's present stride in redesign is about one thousand items per year, mostly in the field of home furnishings where his experience is broad and well grounded. His list of clients reads like a who's who list of American Industry and the designs and redesigns emanating from his workshop and offices are all of his personal creation.

When these designs are finished from the carefully scaled drawings, a plaster model is developed and finished as nearly like the actual product as possible. When this meets with approval, a full size model in the actual material is developed for the manufacturer.

His choice of materials is based upon a wealth of data and information which he has gathered during the years since he graduated from Syracuse University at which time his chief interest was painting and collecting antiques. He has assembled a vast and enviable collection of early Americana, including the greater part of a village with tavern, school house, fire house, apothecary and other buildings, which he has transplanted from a little town in New Hampshire to his estate in Connecticut. Here, amid these inspiring surroundings he has studied the tastes and habits of Mr. and Mrs. America from



★

Only a permanent non-changing material would do for the jamb of the Norge Refrigerator door—so Lurelle Guild selected these laminated plastic strips which screw securely into place to afford a tight, good-looking and thoroughly practical seal. Control knobs and door handles follow the entire industry's trend toward the use of plastics for such items

those first days when they set up housekeeping in their stockaded village of log huts, down to the motives and manners of today's leisure and diversions. He has followed their changing habits and destinies through Colonial days and has gathered rare examples of their early craftsmanship upon which he bases many of his modern designs. He has written more than two hundred articles and books on the subject nearest his heart —the American Home.

With this fundamental knowledge of the background of our forefathers, and a keen analytical interpretation of the reasons behind changing conditions as they influence our lives today, he is in an enviable position to create and design "best sellers" in his field. His designs are not based upon any superficial study of the particular job at hand. If it is a question of redesign, he goes back to the beginning. He learns WHY there is need for redesign. He studies the history of the item to be changed. He learns its origin, its uses and analyzes its past performance and its weaknesses. Then when he gives fresh outline, when he (*Continued on page 66*)

For the streamlined Pullman coach Mr. Guild specified permanent-finished plastics for window sills and table tops. Twenty years from today the easily cleaned surfaces will still be the same color . . . for, in plastics, the color goes all the way through

★

Before and after views of the Aluminum Cooking Utensil Company's drip coffee pot and tea kettle. Some criticize the non-hinging handle. Guild answers that research proved it unnecessary, even unwanted, because hinged handles stay down at the wrong times, get hot and charred. Few criticized design . . . and sales records routed these

★

DESIGN FOR BLACK

by Franklin E. Brill
GENERAL PLASTICS INC.

DESPITE the apparent popularity of pastel shades, about three quarters of all molded parts today are made in plastics' No. 1 color—good old black. With little or no publicity appearing on black materials, users and designers of plastics are apt to take it for granted, and overlook some of the extremely attractive and rich-looking effects obtainable with this inexpensive and always appropriate color.

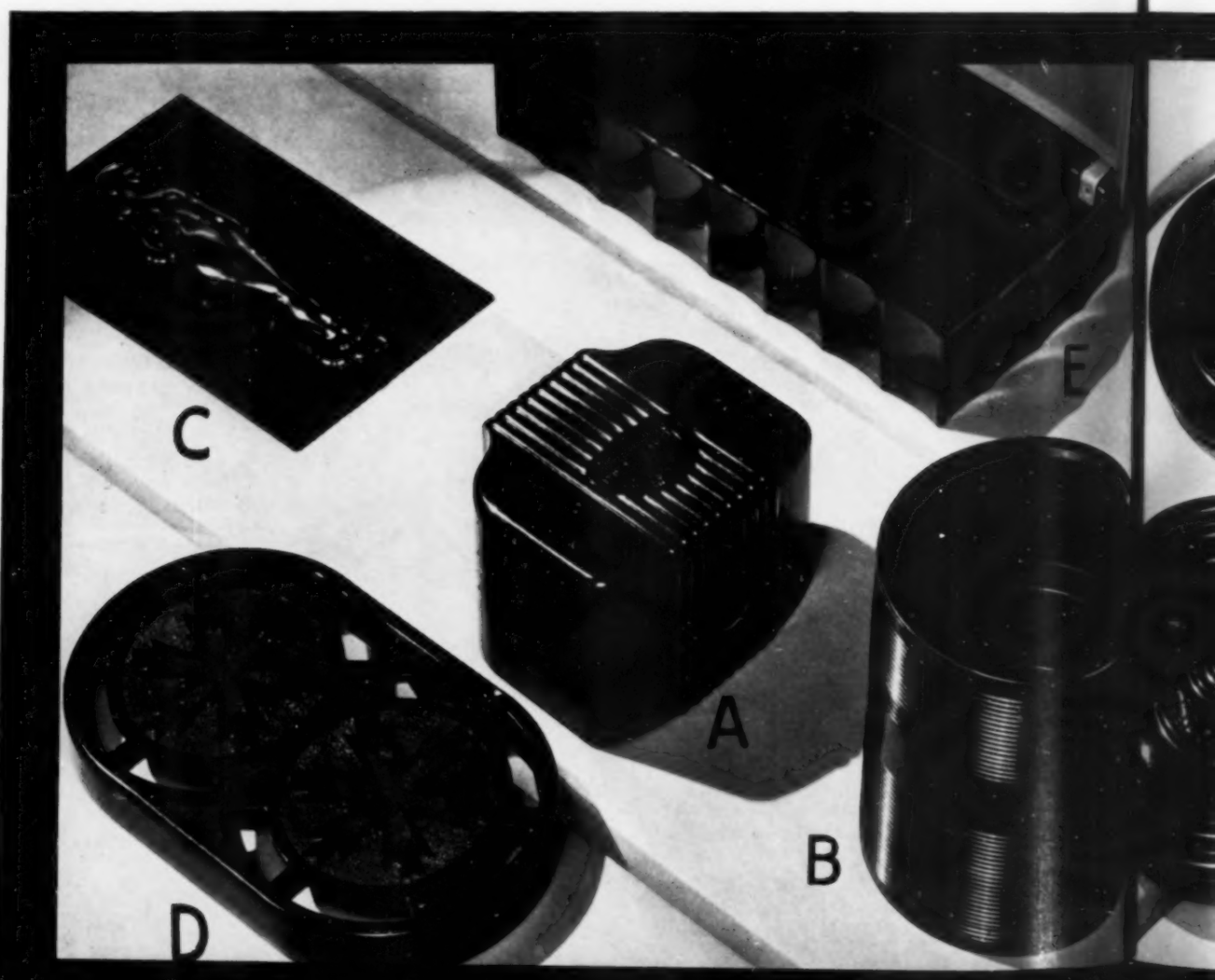
In designing black molded products, there are several things to keep in mind. One is that a *flat* black molded piece has no particular surface interest of its own, and it is only when the surface is curved to catch a highlight that we realize how sleek and sparkling the material is. Catching and controlling these highlights should be the plastic designer's first thought, since the shaded areas and the highlights produce a pleasing black and white contrast.

Designing for Sparkle. Another thing to keep in mind is surface textures. Just as the brilliance of jewelry is at its highest when laid on dull plush, so is the lustre of a black molded piece at its highest when parts of it are treated to prevent or diffuse highlights and create soft-textured, dull areas. Alternate stripes of smooth shiny surface and dull—the dull accomplished by very fine ribbing—is one way of obtaining this extra brilliance.

Rich sparkling black moldings can be achieved in several ways. One is by sculpturing the piece to catch highlights that wouldn't ordinarily be caught. Another is by using wiped-in decoration in a light color. A third is by contrasting dull and shiny areas. Still another is by combining the black molding with bright, gleaming metal parts.

Sculpturing. There are several examples of sculptured moldings in the illustrations below. The piece marked A illustrates the use of parallel convex ribs to catch highlights and add a sparkle and brilliance to the piece which might otherwise have been dead-looking and dull. B illustrates a similar use of finer ribbing which achieves an interesting satiny look, and contrasts

Concave flutes, parallel ribs, dull and shiny designs and bas-relief sculpturing distinguish this group of black phenolic pieces. Note how they throw gleaming high-lights from any position, combining sparkle with dignity



with the smooth, unribbed band in the center. Mold treatment to produce such effects is done by machine and costs relatively little.

Then there is the conventional bas-relief sculpturing, a more expensive die-making operation, but adding nothing to the per-piece cost. Note in piece marked C how the highlights on the molded figure lend interest to the flat black piece, which would otherwise be rather uninteresting. Two other techniques are included in this group: one, D, is an abstract symbolic design by Sinel in dull and shiny, with the raised shiny areas looking doubly lustrous. The other, E, consists of shallow concave flutes—an extremely simple and practical highlight device with many uses—and has the advantage of creating a sparkle from any position, without harboring dust. It can be used on all sorts of pieces.

More Techniques. On the other pieces in the second illustration we see treatments to add lustre to flat black parts. F would ordinarily be molded flat, but the designer used a series of set- (*Continued on page 55*)

Right: Bright metal parts, inlays and applied metal or foil accents produce a richness that no color can approach. Two of these objects actually sold better in black than much more costly pastel colors

Concentric concave flutes and grooves, radial sculpturing, set-backs and wiped-in engraving give these pieces plenty of sparkle and appeal. It's all a matter of high-lights. All photos courtesy of General Plastics, Inc.

NEW IDEAS

★ As a novel expedient for imparting resilience and flexibility to molded articles, thus giving them properties which cannot be attained with synthetic resins alone, thin layers of soft rubber are laminated with thin layers of a synthetic resin, which may be a phenolic type, or a urea resin, or the like. Rods, tubing or sheets may be made from the laminated product and shaped articles can be readily made from these, particularly useful examples being furniture casters, and boxes or like containers which can be made in decorative effects if desired. (Societe Anonyme des Etablissements Kalamazoo, French Patent 775,356.)

★ Molded letters, to compete with metal or glass letters for use in signs or on show windows, have so much attention value that their ready sale at relatively high prices justifies the faith of those makers who dared take the risk and began active production. The risk was by no means small, for at least 75 molds are required for a single alphabet (capital and lower case letters, numerals, signs and symbols), and several sizes and styles of lettering must be offered, so that the molder must make up several hundred molds to begin the business. But the molded letters in their many bright colors are so attractive that they command premium prices as compared with the conventional metal and glass letters, and so the venture justifies itself. Resins of the urea-formaldehyde type are preferred for the molding compositions. (Kunststoffe, Jan., p. 17–18.)

★ Taking advantage of the fact that thorough purification greatly improves the resistance of artificial dentures to the severe conditions of prolonged exposure in the mouth, where no development of tastes or odors can be tolerated and any loss in color would be objectionable, dentures are now made of plastics made from highly purified mixed vinyl compounds. Residues of spent catalyst, metallic impurities and unpolymerized or insufficiently polymerized material are all removed by the purification and the final plastic contains from 75 to 95% of vinyl chloride with 5 to 25% of vinyl acetate, co-polymerized to the desired degree. (Frazier Groff, Carbide and Carbon Chemicals Corp., U. S. Patent 1,990,903.)

★ A new screw cap closure for bottles is molded from a phenolic resin and is topped by a thin metal shell which holds a sealing disk in position so that when the cap is screwed on to the bottle the sealing disk is firmly pressed between the metal shell and the flanged top of the molded screw portion of the cap. (A. A. Thornton, Gutmann and Co., British Patent 416,808.)

★ A molded magnet core which looks like polished steel and actually does contain as much iron as many alloy steels is now a reality. It is made from a molding powder which is so heavily pigmented with fine iron powder that the synthetic resin content is only 6 to 8%; in mechanical strength it is inferior to fibrous synthetic resin plastics, but for service as a magnet core it is entirely suitable. (Kunststoffe, Jan., p. 17.)

★ Phonograph records which have superior playing and wearing qualities are molded from cellulose esters, or from a synthetic resin plastic such as glyptal resin or a vinyl-resin, into which a very finely divided magnetizable metal has been thoroughly dispersed. The metal, preferably iron or an iron alloy, is obtained in the necessary state of extreme subdivision by decomposing gaseous iron carbonyl to liberate fine particles of the metal. (I. G. Farbenindustrie Akt.-Ges., British Patent 418,096.)

★ A very light, porous synthetic resin material which is incombustible and is formed with a waterproof covering skin is made from a phenolic or other type of synthetic resin by compressing a gas into the resin and then expanding the gas, or by adding blowing agents or by frothing the resin composition with a beater. Shaped articles made from this porous material are highly efficient for sound insulation and for heat insulation. Being water-impervious by reason of the thin skin which is formed over the porous body of the material, it is also useful as a structural material in unsinkable boats. (Camille Leon Eugene Burel, French Patent 765,547.)

★ Russian investigators, seeking to define the limitations of synthetic resin materials under exposure to severe conditions, found alkali resistance much greater than acid resistance in phenolic and coumarone resins. Water and certain brines were harmful to the finish in some cases. Sulfur dioxide, a common impurity in the air near industrial centers, was especially harmful to Albertol and to coumarone resin; ester gum showed the greatest resistance to this gas. Chlorine also attacked most of the resins which were tested; carbon dioxide generally had no effect. (S. Yakubovich and M. Goldberg, Sa Lakokrassochnuyu Ind. *1934*, No. 2, pp. 44–47.)

★ Vessels used in blood transfusions have been made of amber because the surface is not easily wetted and so the blood does not coagulate. But amber is expensive, so efforts were made to introduce high grade unpigmented synthetic resins for the purpose. Molding was successfully accomplished, but the resin was never fully converted to resite and so the vessels would not stand the necessary repeated sterilization in boiling water. New molding resins of the Neoresite type are now available, however, which make blood transfusion vessels superior even to amber itself in withstanding repeated sterilization. Thus the transfusion vessels can now be made from a relatively inexpensive resin without sacrificing quality. (Kunststoffe, Jan., p. 18.)

★ Artificial teeth are now being made from phenolic resins, but not for a permanent place in the patient's mouth. They are for the use of students in dental colleges, for practice purposes to minimize the need for experimental work on real teeth in the clinics. The plastic teeth are especially useful for practice in drilling. (Kunststoffe, Jan. p. 18.)

★ As a solution for the problem of combining the necessary electrical properties with the mechanical properties needed for good performance and long life in resistor elements, a newly designed resistor is provided with a backing which gives the needed support to the resistor element. Since it is not easy to reconcile one plastic binder with the required properties in these two structural elements, a synthetic resin of the phenol condensation type is used in one part and a natural resin, preferably shellac, in the other; thus a unit is obtained which is both mechanically and electrically satisfactory. (Frank Gahn, Erie Resistor Corp.; U. S. Patent 1,984,925.)

PRINTED PAPER NOW MOLDED INTO JAR AND BOX COVERS

SOLUTION of one more problem which has long confronted the plastics industry must now be credited to the Tech-Art Plastics Company. This involves the molding of paper, which may be printed with trade marks, illustrations, company names or other inscriptions, onto the surface of molded parts, such as covers for boxes or other flat or crowned surfaces. The same process may also be employed for the lining of containers with treated paper to keep the contents out of contact with the phenolic wall of the container.

Although the process still has to see commercial application, it has been used with success in molding more than a hundred crowned box covers, one of which is here illustrated, and there appears to be no reason why it cannot be employed in large quantity production, as the molding already done follows regular production practice except that the treated paper must first be placed in the mold against the surface which forms that part of the molded piece to receive the paper.

The process naturally involves certain limitations. It cannot be used, of course, with colors that are affected by the treating process which preceded the molding or by the heat used in molding, unless such a change as may occur is acceptable. No serious difficulties along this line have been encountered as yet, however.

To date, the process has been applied chiefly to forms of craft paper and to a standard form of paper, intended for wall coverings, and on which a wood grain design has been printed or lithographed. The cover here illustrated was done with the latter type of paper, but before molding, bright metal initials were fastened to the paper. In the molding, these initials were imbedded into the surface and are flush with the paper surface of the molded piece. As the molding compound used in this instance is an ordinary mottled brown and black Bakelite which yields a mottled effect on the back of the piece, and is about the same color as the walnut-colored wood-grain paper, the joint between the two is difficult to see. Nevertheless, the two surfaces, front and back are distinctly different in appearance and there is none of the mottling of the compound seen on the walnut surface.

Details of the process will not be made public, but it may be said that it involves an initial treatment of the paper without which the process is not successful. The side of the paper which goes against the molded piece is treated with phenolic material, but the latter does not pass through the paper, either in treatment or in subsequent molding. The other surface of the paper receives another treatment with another material, and this too is quite important in securing the final result. Paper to be used in the molding operation receives the treatment in sheet form. It must not be cut into the sizes to be used, but must be left in large sheets until after treatment, after which it is cut into the desired sizes to fit into the mold cavities.

When thus cut, the individual pieces are placed in the mold with the phenolic side up and the printed side against the mold surface. The molding compound is then put in place and molding proceeds just as if the paper were not used, except that the time of cure may be increased somewhat because of a little slower transfer of heat through the paper to the molding compound. It is best, of course, to have the piece of paper fit the mold cavity closely or else provide some centering means to prevent it from shifting as a result of the powder flowing.

When the molding is completed, the piece is removed in the usual way. The paper surface will be found polished or will take a polish if the mold itself does not give it the desired gloss. In effect, the paper becomes a part of the molded piece and there is nothing to make it look as if it were cemented on with an adhesive. Thin veneers of wood can be similarly treated and applied.

White or very light-colored papers may be slightly discolored, but in general there is nothing to indicate that any of the phenolic resin has permeated the paper. Further experiment will be required to determine what effects may be produced by special inks when they are heated, but there seems to be little question that a sufficient range of colors that are not affected will be found to permit of securing almost any desired color effect. Perhaps some after-yellowing may result from the phenolic resins if light colors are employed.

It is anticipated that the new process will result in a new and important method of labeling and decorating molded products without using raised markings debossed lettering or figures subsequently wiped in, which heretofore has been about the only way of marking phenolics with contrasting colors.

MOLDED MOTOR HOUSINGS PASS EIGHTEEN MONTH "TORTURE" TESTS

ONE of the oldest firms in the adding and calculating machine industry is the Felt and Tarrant Manufacturing Company. Its product, the Comptometer, has not only won a distinctive place for itself in the banking and business world but has had its name appropriated to denote the operation of adding machines in general. Thus one reads, in the classified sections of metropolitan papers, of "Schools of Comptometry" and employers advertise not for adding machine operators but for "Comptometrists," and, save the mark, for "Comptometricians."

The background for such a conquest of the business imagination is found in the company's product, a machine widely used wherever accounting, research, banking or billing call for accurate and speedy figure work. Machines are supplied in sizes ranging from eight to twenty columns while others calculate fractions such as quarters, eighths, twelfths and English and Foreign currencies.

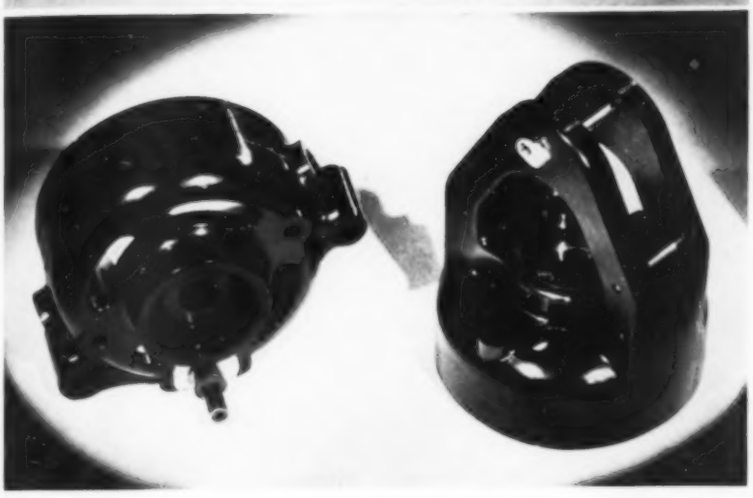
Until two years ago, the use of plastics on these machines was restricted to such items as finger-keys. Here the company followed the standard practice of the industry of which it is a part.

About that time, however, it was decided to produce a faster model with a self-contained motor drive. It was expected that such a model would find a market among users who devoted a large part or all of the day to machine operation. For such people, the electric drive would eliminate a large part of the physical strain and fatigue incident to constant key-pressing and thereby make for greater speed and accuracy over long periods of work.

A number of restrictions, inherent to the problem at hand, led to a consideration of the use of plastics to house the electrical motor mechanism. First, it was essential that the motor be thoroughly insulated from the machine itself, so that there would be no chance for short circuiting or shock from the motor. Second, it was required that a device of this sort be manufactured to very close tolerances and with a perfect alignment of bearings. Third, in spite of the considerations of compactness, complexity and accuracy, it was required that the motor ends be of sufficient strength to afford a large factor of safety beyond all probable rough treatment and wear that the machines were likely to receive. Machines such as these must be prepared to withstand temperature and climatic changes without failure or lowering of their efficiency. A last requirement, growing out of the international character of the company's business and the relative isolation of many users of the machines, called for completely interchangeable parts, so designed that the local repair man. . .or, if necessary, the local electrician. . .could replace a damaged part.

It was within the limits of these requirements that the plastic engineers were asked to work. From a molding standpoint the job presented a number of unusual features. The smaller of the two pieces which,

The assembled motor housing . . . a piece designed essentially for utility rather than appearance, which has yet captured much of that beauty of line which industrial designers strive for



The assembled electric Comptometer and (below) the molded motor ends, showing the intricacy of detail. Note the "ears" on the left-hand piece, molded of a canvas impregnated material. Comptometer photo shown through the courtesy of Felt and Tarrant Mfg. Co. Molded parts shown through the courtesy of Chicago Molded Products Company

together with a metal central shell, form the complete housing, contained a central hole, housing one of the two bearings, a metal insert bearing for the driving gear, two suspension lugs with holes requiring accurate alignment and two holes through which the brushes are inserted to reach the motor mechanism. In addition, as if to further complicate matters, the remaining solid areas on the outer face had to be punctured with ventilating ports to permit of the circulation of air through the motor windings.

The bearing hole had to be concentric with its mate on the other piece and all suspension and assembly holes had to be concentric with these two, to insure perfect alignment. Inner edges of the two parts had likewise to be held to exact dimensions so that, when the parts were assembled, the required exact alignment would be assured.

Most interesting was the problem presented by the suspension lugs. While the main part of the molded piece had to be of a wood-flour filled phenolic material, to insure fine finish, these lugs or "ears" had to be reenforced with canvas impregnated material to attain the requisite strength and resistance to shock and strain. The use of this material permitted much thinner wall thickness and much smaller overall size in these key sectors of the molding.

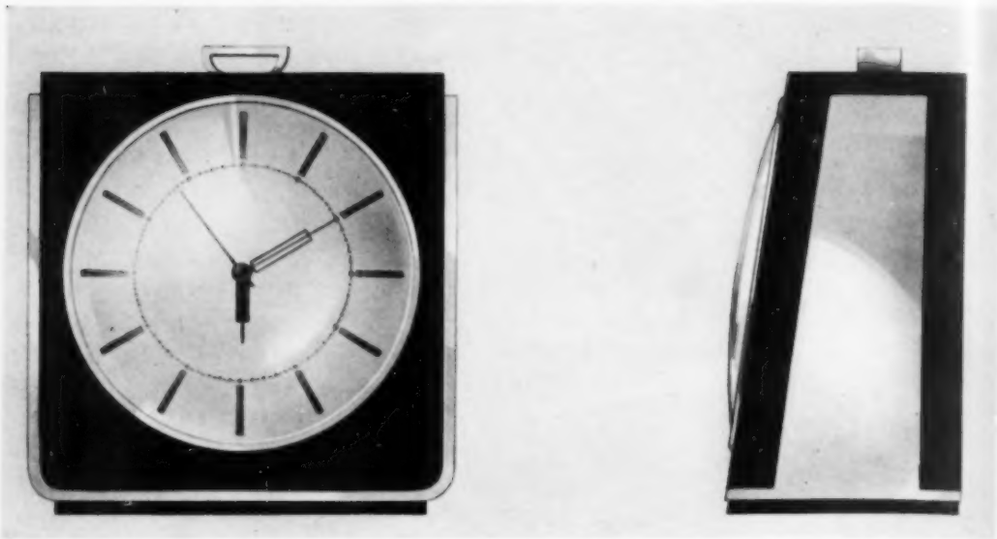
The larger piece required no suspension lugs, but in addition to the bearing, assembly and ventilating holes, a frame to house and support a governing mechanism was necessary. This consisted of two parallel molded struts rising from the motor end itself and containing, as cross-pieces, two inserts, aligned in two planes. A spring mechanism, pivoting on one, opens and closes an electrical contact between a pivoting point and one fixed to the upper insert. Thus an instant shutting off of the current occurs whenever the spinning governor rises beyond a given point.

Thus, about two years ago, molds were devised and a very limited quantity of moldings, made to tolerances as low as .001, were molded. Then began the tests . . . designed to subject the housings to every type of "torture" likely to be received under the most adverse conditions of use. Comptometers using the molded parts were built and placed in selected locations. These were subjected to eighteen months' service . . . . knocked around, run fast, run slow, run intermittently and run constantly. Month in and month out, records were taken.

At the end of eighteen months, all test machines were called back. Once again in the laboratories, they were knocked down and tested, to determine their ability to withstand adverse conditions and to discover whether any changes were indicated before the product was ready for the market. Naturally, considering the tremendous harm which a defective mechanism could produce, the possible irreparable damage to the company's reputation, such care was of the most exacting and painstaking sort.

Finally, all tests passed with flying colors, the company ordered production of housings on a commercial scale and announced the new machine to its public. Unlike those manufacturers who must wait for time to tell them whether they have designed well, Felt and Tarrant know in advance that presence acceptance of the machine means permanent acceptance . . . for the plastic parts have passed the hardest of "torture" tests.

Credit: To Chicago Molded Products Company for development and molding work. To the Bakelite Corp. for molding materials.



Two views of a clock design by George Graff, showing the possibilities for effective combination of molded plastics and metal die castings

COMBINING MATERIALS

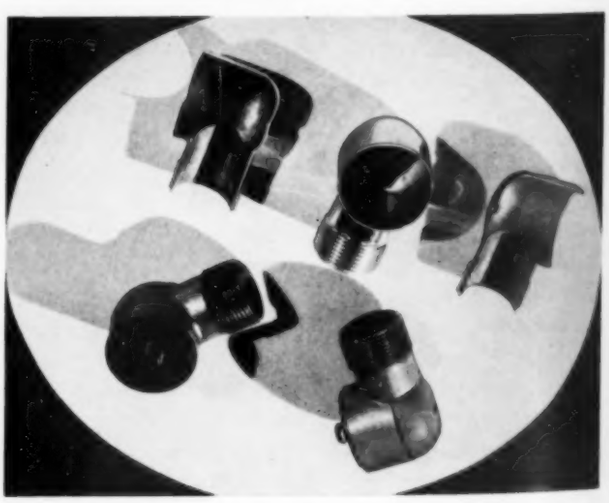
by Robert L. Davis

DESIGN and redesign of consumer products—in order to keep them alive, in order to keep stock moving—has demanded much ingenuity and intelligent understanding of the available materials and their methods of processing. And many designers are beginning to appreciate the advantages of utilizing combinations of materials, comparing and contrasting their colors and qualities most effectively, achieving popular designs most economically. One of the most popular of these combinations is that of molded plastics and zinc alloy die castings.

Although the physical properties of these two materials have made them economic partners in purely industrial products, their principal use in combination has been in decorative design. The combination of the colors of the plastics with the metal finishes of the die castings offers a simple means of breaking the monotony of a design. Furthermore, the interchangeability of these colors and finishes allows a wide variety of combinations from the same design—from the same molds and dies.

One of the most effective examples of this type of design is the cigarette box, shown in an accompanying illustration. The base and the lid can be furnished in a wide range of colored plastics; the die cast box shell and ornament were made in both bright chrome plate and a buffed or "butler" finish. By varying these combinations, it can easily be seen, a complete line of these boxes were produced of widely varied appearance. The red and the green with bright chrome are gay and sparkling, the red and "butler" finish combination basks in the comfortable luxury of

This cigarette box is produced in several effective combinations of colors and metallic finishes through the utilization of molded plastics and zinc alloy die castings



Molded plastics and zinc alloy die castings found industrial favor in this airplane spark plug shield. The plastic was molded inside the die casting

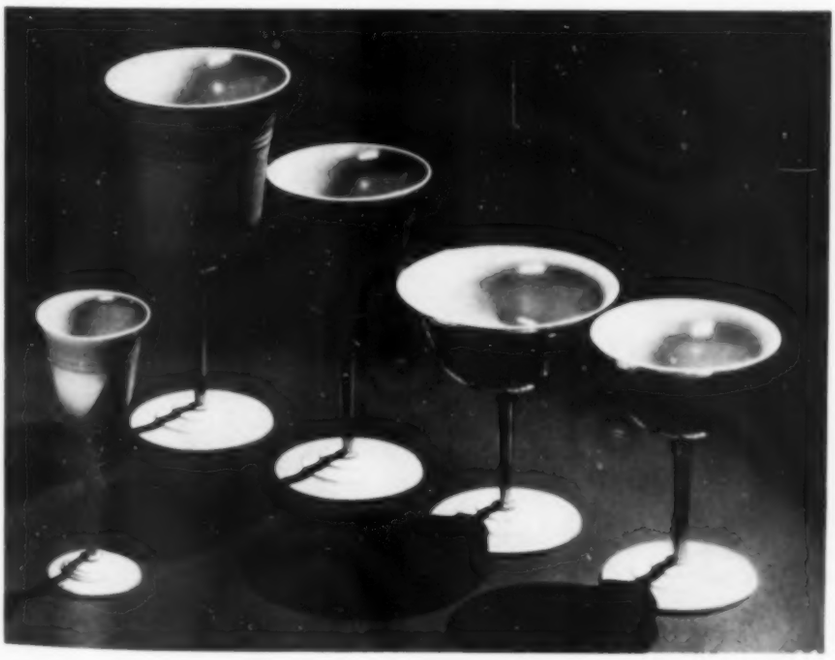
The very popular "On Me" game is sturdily built and effectively presented with the colorful Plaskon housing and the zinc alloy die cast base

A bath salts dispenser, designed by George Graff, illustrates the aesthetic advantages of combining die castings and molded plastics

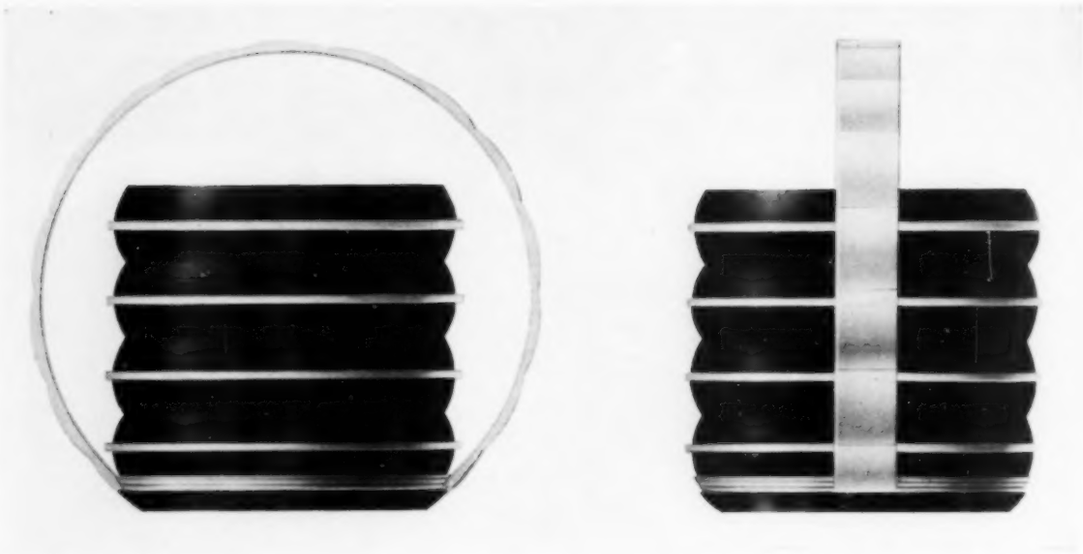
a men's club, the black and "butler" finish has great dignity. All of these are from the same design and economically produced from the same dies and molds.

Clocks, picture frames, bud vases, as well as boxes of many kinds for toilet requisites, cigarettes and playing cards have been effectively designed in these combinations. Walter Dorwin Teague designed the highly successful Stormoguide for the Taylor Instrument Company; George Graff designed a desk pen set which has enjoyed a great popularity for the past two years, and Fee and Stemwedel Manufacturing Company has now designed and manufactured the combination thermometer and barometer, shown here, in molded plastics and zinc alloy die castings. Interesting, too, are the original designs by George Graff which are reproduced with this article. The coasters are of plastic with a die cast ring; the interesting holder is a simple die casting. These coasters could, of course, be made in many gay colors with plastics, and their simplicity is effectively pointed up by the metallic circle of chrome plated die casting.

In the airplane spark plug cover, shown in an accompanying illustration, the industrial possibilities of combined plastics and die castings are suggested. The dielectric properties of the plastic improved



Van Doren and Rideout have effectively combined molded plastics and silver in this stemware for the National Silver Company

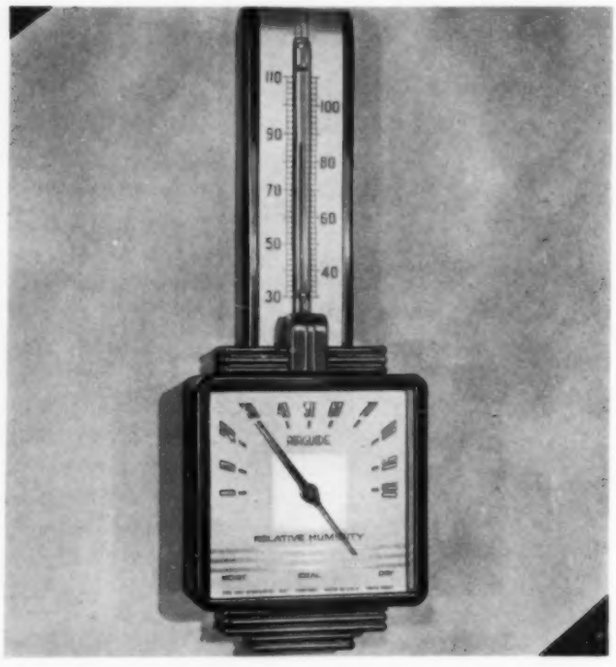


A set of molded coasters, designed by George Graff, in which a narrow metal band on each coaster provides a note of similarity with the metal holder into which the coasters are stacked

radio operation by reducing the interference of the motors. The extremely thin walled die casting (less than 0.020 in.) greatly simplified the fabrication by acting both as the casing for the plastic and the threaded member. The casting is placed in the mold and the plastic formed within it. The threads were of course die cast.

Another example of the industrial application of the combination of plastics and die casting is found in the assembly of the American District Telegraph Company's fire alarm box. In this instance the plastic serves principally as an insulator. Die castings holding the thermostat units are assembled onto the plastic and the case is comprised of two zinc alloy die castings which enhance the appearance and marketability of the product. These cases are usually enamelled in either bright red or black.

In designing for die castings or for plastics, one has practically the same mechanical principles of manufacture with which to work. They are both produced in steel dies or molds. These dies or molds are in each process relatively expensive and so both these processes are fundamentally most economical in large scale production.



This combination thermometer and barometer is encased in an effective combination of a plastic and a die casting

Another example of the industrial use of these two materials in this fire alarm box

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PLASTICS...THE FUTURE AND THE CHEMIST

by John T. Stearn

In keeping with its policy of presenting all sides of controversial subjects, Modern Plastics asked John T. Stearn, a chemist of wide experience in the plastics field, to expound the chemist's view of the importance of research in the development of plastics. We anticipate and invite disagreement. We know that many will feel that the chemist has done his work so well that the industry as a whole may suffer from an inability to digest the present achievements. As the journal of *all* the industry, we take neither side, but offer rather to open our pages to an exposition of the contrary viewpoints of the designers, the merchandisers and the sales-minded men.

Mr. Stearn entered the plastics field in 1929, when he became associated with the development of the first all-urea molding resin. He has also done much research in the phenolics, gylptals and other synthetic resins. His particular endeavor has been the production of a highly water-resistant cellulose filled material.

THROUGHOUT his fight for existence, man has learned to make use of certain accessible materials which he found suitable for fashioning utility articles. Their main characteristics generally included: permanence, hardness, toughness, rigidity, imperviousness, and ability to take a pleasing finish. The earliest attempts necessarily made use of materials as found by shaping them and generally combining several of them in one article to capitalize their varying characteristics.

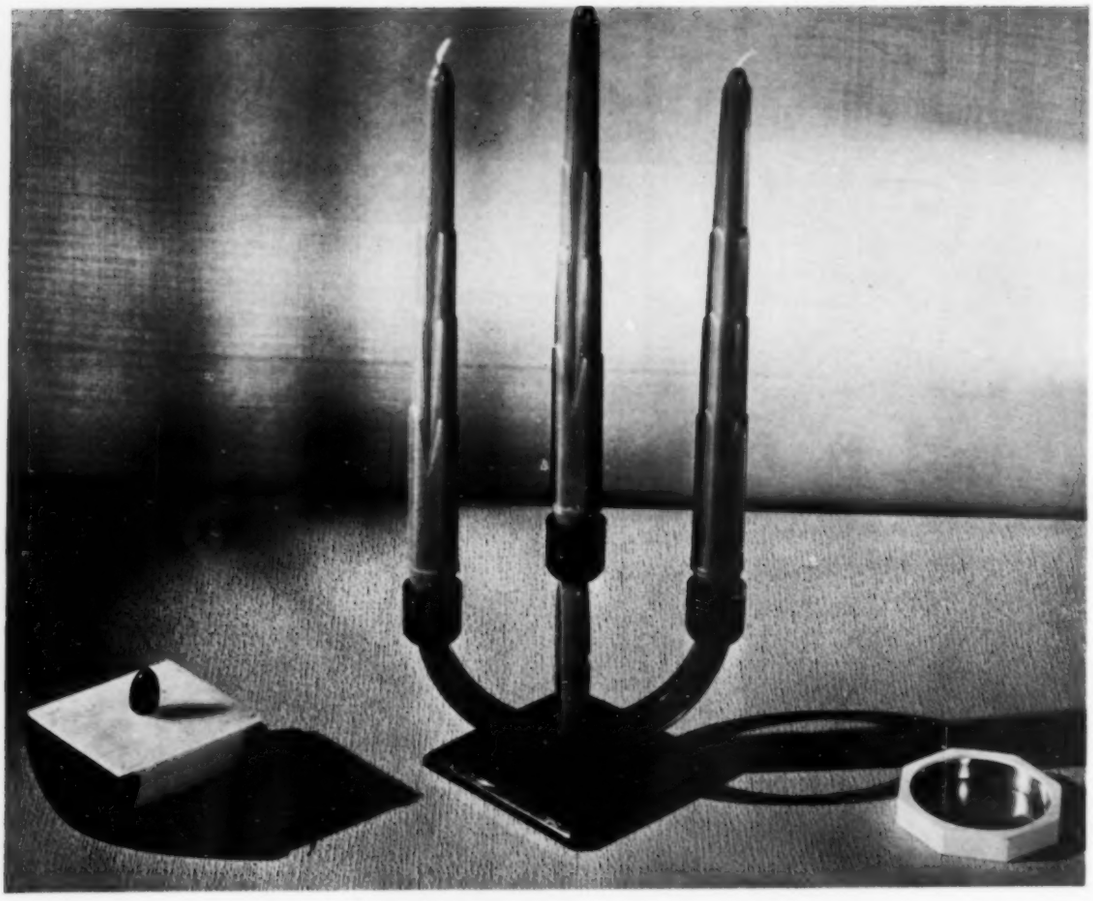
All materials which can be worked into complex shapes in a soft, formative stage and can then be hardened to maintain these shapes permanently are of artificial origin and their manufacture and use represent an advanced state of civilization. The earliest of these materials, clay, porcelain and glass, still fill the overwhelming part of our needs along these lines, because of their especial fitness for use as food containers, housing material, as modeling material for artistic purposes and in electrical insulation. The important qualities for these applications are chemical inertness, imperviousness and a high degree of rigidity. Their drawbacks, such as shrinkage and deformation in "setting," and brittleness, do not unduly impair their usefulness for the purposes mentioned. Besides, their general availability at a low cost is an outstanding factor in their favor.

Nevertheless, these mineral or inorganic materials are a far cry from what has come to be regarded as an ideal plastic. From a standpoint of versatility and adaptability, the desirable characteristics are more compatible with organic materials and among these the pioneers of our plastics industry have therefore done most of their work.

What can be considered the scope of the synthetic plastics field and what are the most important characteristics of an ideal plastic? An analysis of these questions should be of the greatest interest to any one engaged in this field and, if competently answered, should insure at least a start in the right direction. In groping for new and better materials and also in attempting to find outlets in this field for by-products of various industries, these basic questions are easily lost sight of and, while the result may be a temporary success, it will ultimately tend to prove a poor investment. About all that can be positively gathered from much of this work is an admission, read between the lines, that present materials are still imperfect in many respects. The accurate analysis of market requirements for plastics and the development of new materials which fill definite requirements is the chemist's job, while it is the chemical engineer's job to develop their manufacturing methods and to fit these methods profitably into chemical industry as a whole.

In designating and comparing plastic materials the adjective better is meaningless without exact specification of the conditions which will be encountered. Practical use in molding as well as of the finished article determines the value of any material. For expediency attempts are made to express physical properties by standard tests but these do not as yet fulfill their purpose, namely, to represent exactly the strains encountered in practical use. For the important property of resisting shock (toughness) there is still no better test available than to drop, throw or hit finished pieces.

Organic plastics have the highly desirable property of passing through a truly molten stage (not merely semi-solid) without undue volume change, of making exact replica in steel dies under pressure and without undue wear even in very complex shapes, of being good heat and electrical insulators, and possessing great toughness as opposed to brittle- (*Continued on page 58*)



Hannah Porter Giftwares in which Pastel Shades of Cast Phenolics are combined with Chemically Colored Duralium in thoroughly delightful manner

NEW FIELDS TO PLOW

by E. J. Longee

A FIRST glimpse through the New York Gift Show, which occupied the entire third and fourth floors of Hotel Pennsylvania the week of February 25th, gave one the impression that all gifts had turned to metal and plastics. Of course they haven't, but the preponderance of aluminum, chromium, copper, and brass gave that impression nevertheless, and plastics are generously used to decorate these metal gifts and make them practical.

Red seems to be the favorite color for plastic ornamentation. I was told by several manufacturers that it outsells other colors in combination with metals. This is probably due to the cheerful note it lends to the gay scheme of modern decoration. Greens, ivories, blacks, and pastels have their place and are by no means out of the running where merchandise is designed for the conservative buyer.

With nearly three hundred manufacturers exhibiting thousands of items it will not be possible in this limited space to give my comprehensive description of the merchandise shown. But there are items of particular interest, either because of unusual ways in which plastics are employed or because they are enjoying unusually brisk sale, about which you may wish to know.

Hurst Incorporated, of Boston, has made very practical use of cast phenolics as a material. A cigarette box, which rocks for convenience but doesn't spill, is illustrated with a twin candle holder and ash receiver—all using plastics as their principal material. The ash receiver is a white plastic octagonal frame with metal cup insert and is among the fast selling numbers at the show. The candle holder is one of several excellent designs which have met with splended reception and depend upon no other material than plastics for their decoration and appeal. Larger ash receivers—some with lighters, single and double snapshot frames, larger frames up to 8 by 10 inches, poker chips and checkers of pastel shades which are a distinct relief from the commonplace red and black checkers have found a ready-made market. Cylindrical cigarette boxes are not new as gift items, but they are certainly delightful when made from pastel shades of phenolic resins with contrasting covers of the same material. Modern desk sets are attractive and moderately priced.

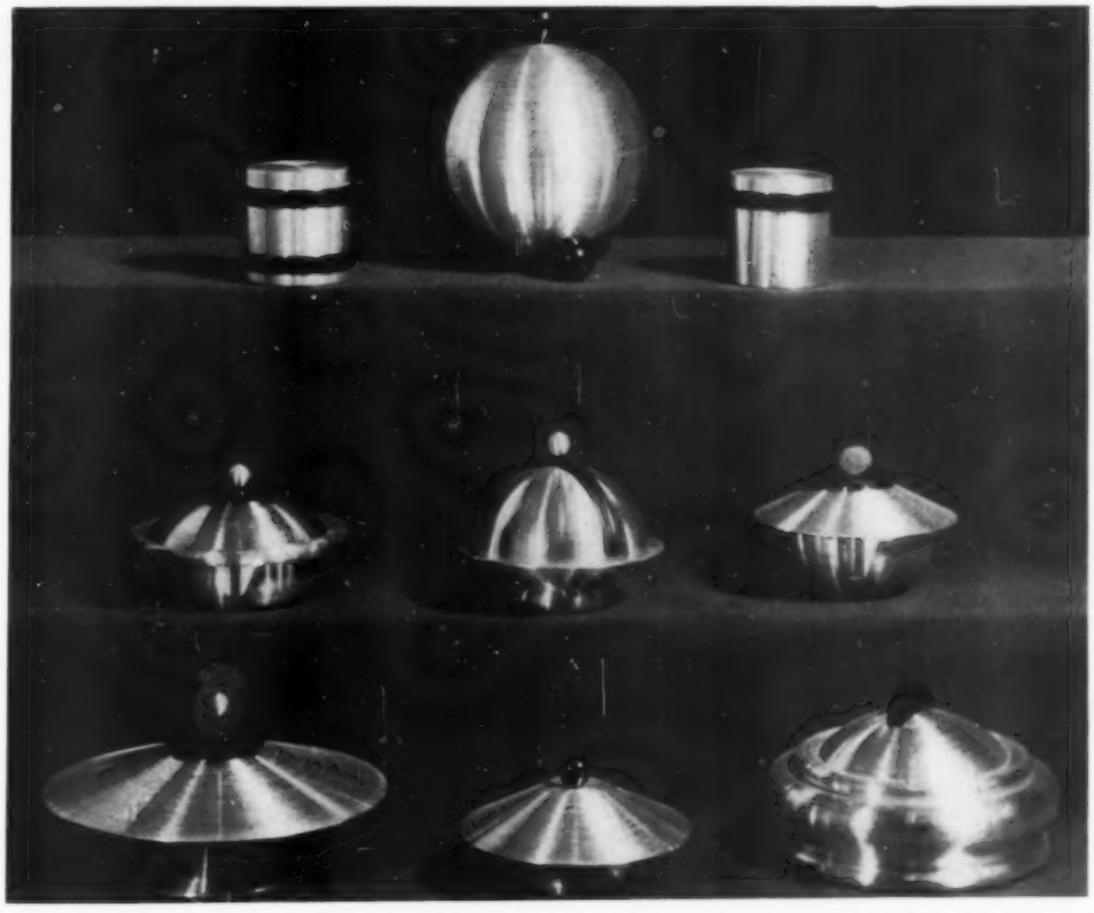
Hurst merchandise is distributed by Plastiks Incorporated, New York. Buyers and manufacturers alike will be interested in what one salesman has to say about the line. Listen to him! "I have been coming to these shows many years with many lines of merchandise, but never in my experience have I had a line which seems to have such instant appeal. Everybody is interested and everybody buys."

Russell Wright, who designs and manufactures his own product, is introducing a modern table or desk lamp of white plastic with copper, and a cigarette container of identical materials to complete the ensemble. As with all his things, they are in splendid taste and thoroughly delightful.

Plastic handles and knobs are everywhere. There is nothing new in that idea, but there is evidence of improved design which keeps them forever interesting. Furthermore, there is no better material available for the purpose because of the insulating quality of plastics, and because they stay where they are put and their finish remains forever the same. Some knobs and handles still shout that they were bought at a price without much thought being given to their decorative opportunities. It is a shame.

Kromex Corporation, of Cleveland, is introducing sixty brand new items designed in its own shops. Chromium, called Kromex in this line, is well combined with plastics to their mutual advantage. Handles and knobs, here, are designed with care and consideration for both utility and appearance. A compote of Kromex is supported on a standard of alternating red and black plastic rings which form a truly gay and delightful handle. Much fabricated plastic is used by Kromex because of preferable colors but molded plastics of similar shades are being tried with satisfactory results and considerable savings, says Mr. Asquith who is in charge of the display. He tells me also that his company was the first to combine chromium and plastics in giftwares and doing so brought their business out of the red, turning it into a happy and prosperous venture almost overnight.

The West Bend Aluminum Company displays its new Speedmaster Electric Teakettle, streamlined for speed. The electric unit will boil a quart of water in six minutes or if you are in a hurry you can set the kettle on the gas range, connect the electric unit as well, and get boiling water in half the time. When it boils, it whistles. The most interesting feature to me, however, is the well designed rigid bale of molded phenolic which provides electrical contact pins for the extension cord and a finger trigger to lift the spout cover when pouring. All molded (*Continued on page 44*)



These Three Fast Selling numbers at the New York Gift Show depend on no other material than Cast Phenolics for their decoration and appeal

★ THE SAMPLING PRINCIPLE:

2. Northam Warren Applies It to Nail Polishes

by Ruth Lampland

A NEW application for molded plastics has been successfully tried in the last six months by Northam Warren, Inc., manufacturers of Cutex nail polishes and manicure sets. It is a molded plastic display-sampler. It takes the place of three dissimilar objects: a display, a set of samples, and a booklet of explanation as the matching of nail polish shades with apparel shades and with various types of complexions. But it makes a better appearance, is more compact and easier to use than the three separate items.

The Cutex sampler is simply and ingeniously constructed. It consists of two main parts: the molded base, and the metal disc attached to the back of the base. Both are in black. The "Sampler" base is tiered, about eight inches long for the upper tier and nine for the lower, which extends out somewhat around the upper one. A detachable white cone-shaped molded cover, tipped with a replica of the familiar black molded fez which is the screw-on cap used on all Cutex polish bottles, holds in place a transparent cellulose disc around whose rim are painted eight oval patches of nail polish, one in each of the eight Cutex shades. The white molded top, naturally, is cut back in eight indentations to reveal these simulated finger nails. As the top rotates, one after another of the small transparent ovals of polish passes over a finger groove in the base. When a customer places her finger in the groove, the transparent oval of polish in rose, coral, mauve, mahogany, or whatever color she wishes, passes over her finger and gives it the appearance of having polish of that shade. Thus one may see at a glance how polish of any shade harmonizes with her skin, with the shade of her dress—and with her own taste.

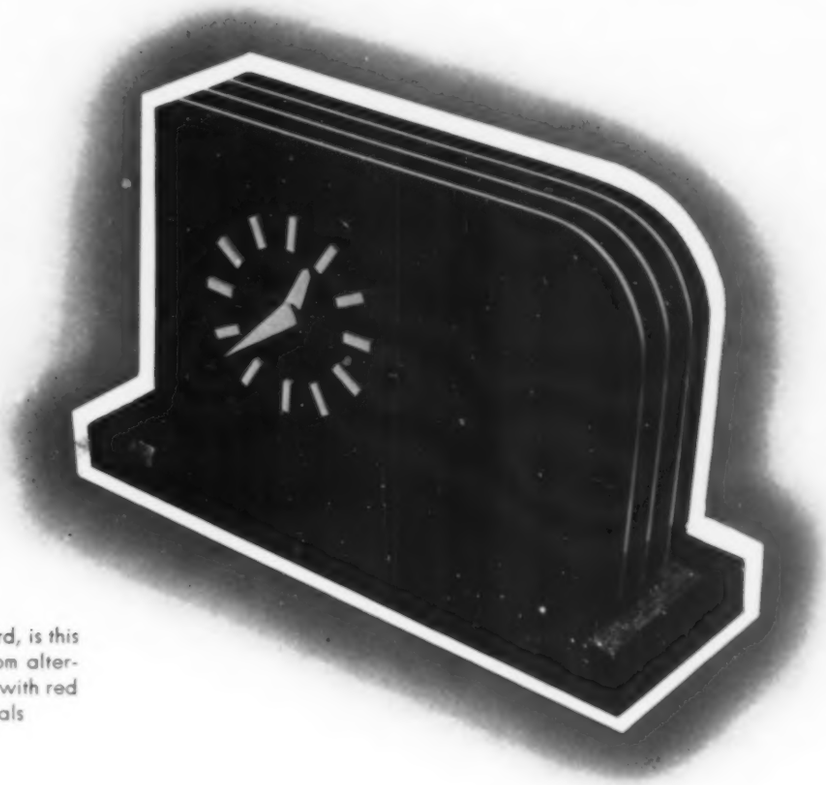
This molded display sampler has comparatively recently replaced a metal display sampler built on the same principle. The metal display, however, lacked the appearance of quality, the smart and distinguished lines of the smooth, lustrous Bakelite. So at this writing, all remaining metal display-samplers are being placed in five- and ten-cent stores to interest the lower-priced merchandise purchaser.

Although the molded display costs slightly more than a metal one built on the same principle, it is from many points of view amazingly economical.

In fact, its greatest virtue is its economy. Economy—in the saving of actual polish, bottles, and brushes which would be consumed either in the distribution of free samples or in the availability of counter samples to be tried on ladies' nails by salespeople. Even the cost of replacing the cellulose discs of samples with fresh ones from time to time is small in comparison to the tremendous cost of distributing free samples.

Economy—in the fact that the sampler is a display as well as a sampler. The black metal disc which forms the back is lithographed in coral, in easily readable script, thus making the display-sampler a focus for a counter display of Cutex.

Economy—in the fact that the large, square, printed sticker pasted on the back of the metal disc replaces the loose folders, booklets, (*Continued on page 55*)



Modern, in the finest sense of the word, is this cast phenolic clock-case—built up from alternating laminations of black and ivory, with red face and ivory hands and numerals

THE CLOCK POINTS THE WAY TO THE DECORATOR

WHEN cast-phenolics were first introduced, two fields offered themselves for immediate exploitation. In one—jewelry—the technique of working the material has progressed rapidly. So rapidly, in fact, that suppliers have been hard put to meet the fabricator's demands for new colors and configurations.

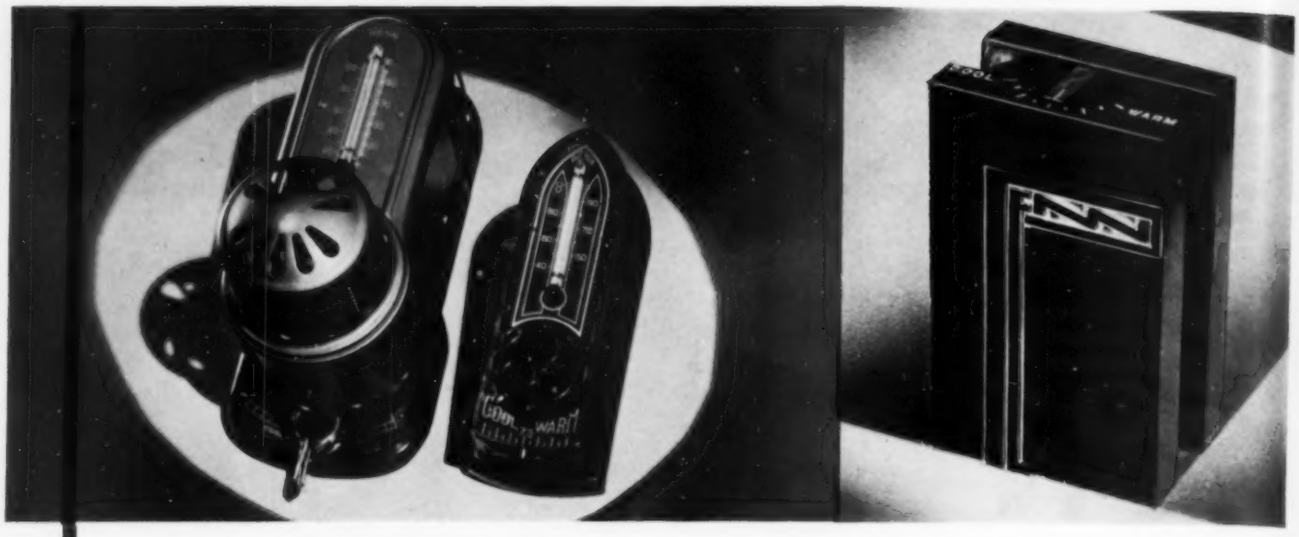
In the other—clock cases—development has been slower, being restricted, with few exceptions, to cases cast as a unit or to those machined from one or two blocks. Yet, so great are the opportunities offered to the designer that further developments were inevitable.

Now, in a clock created and designed by J. H. Tyson and Staff, we find an indication of a few of the lines which future developments are likely to take. Most notable is the use of color as an integral part of the design—a tendency wholly in keeping with the general trend in modern decoration. The clock, illustrated, consists of a clear crystal block containing a gold flake, upon which is mounted a body of alternating black and ivory bands.

These are formed, in the large block, by laminating sheets of the desired thickness to each other. The entire block is then worked as a unit, being cut to shape and recessed to permit of the insertion of the face and movement. Thus the color, instead of being applied to the surface alone, runs right through the material.

In the construction of the face, advantage has been taken of the translucency available in cast phenolics. The face consists of a deep red band encircling a translucent plate into which have been set the twelve ivory numeral points. The hands, also cut from ivory castings, are finely cut to accurate weight and balance. When lighted by a small pilot from within, the face glows with an even brilliance.

Clocks such as this are not planned for mass production, but rather for the middle and higher price registers. Yet the two innovations which are here introduced are likewise applicable not only to mass produced timepieces but to all types of factory produced and special-order decorative installations. Laminations, cleverly used, offer fine color possibilities for the interior decorator, the furniture and the accessory designer while the capitalization of cast-phenolic translucency is possible in an infinite variety of instances.



Progressive stages in the development of wall-thermostats...from ugly, protruding metal case... through Gothic design to the ultra-compact, unobtrusive yet attractive Modern model

RISING SALES CURVES GREET PENN ELECTRIC'S INCREASING USE OF PLASTICS

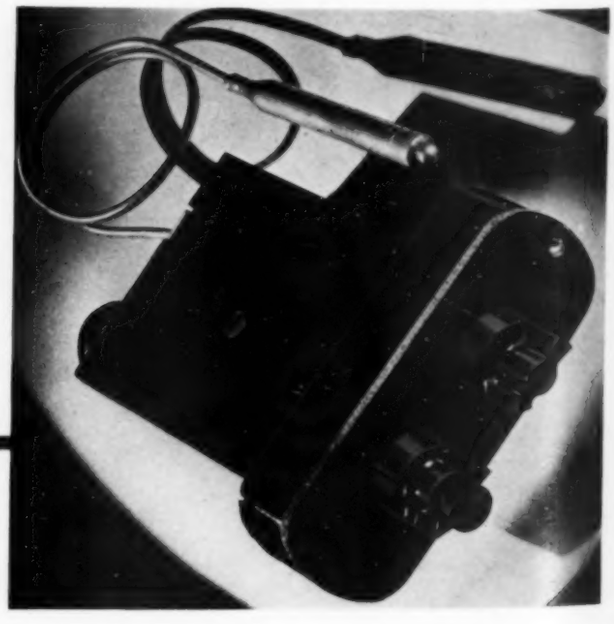
SOME single factor...appearance, cost reduction or improvement of operation...is always the primary cause of the replacement of other materials by molded plastics. But, more often than not, manufacturers who use plastics discover...as their knowledge of the medium develops...that advantages in addition to the original one can be gained by intelligent product planning.

Such has been the case with the Penn Electric Switch Company, makers of thermostats and automatic controls. An examination of their products discloses a progressive improvement of design and appearance, a lowering of bulk, an improvement of operating characteristics and a reduction in costs...all directly traceable to the advantages resultant from the use of plastic moldings.

Consider their thermostats. Their first model stood more than four inches out from the wall to which it was attached. It was six and a half inches high...and nothing much could be said for its beauty of appearance. A second type called upon plastics for both the base and the cover enclosing the mechanism. Immediately, it became possible to materially reduce the space occupied by the instrument while, at the same time, decidedly improving its appearance. Finally came a modern instrument...still more compact, still better looking. In addition, the possibility of providing a widened range of colors...without added expense... resulted in a marked widening of the sales appeal of the product.

In the case of two types of controls shown below, molded phenolics have been used to form the bodies or housing of the switches as well as the adjustment controls, permitting of a more compact unit because of the insulating qualities of the material. At the same time, however, a decided improvement in appearance is reported by the company...a dividend, as it were, on the use of molding.

An unusual instance of size reduction made possible through the use of molding is shown in the comparison



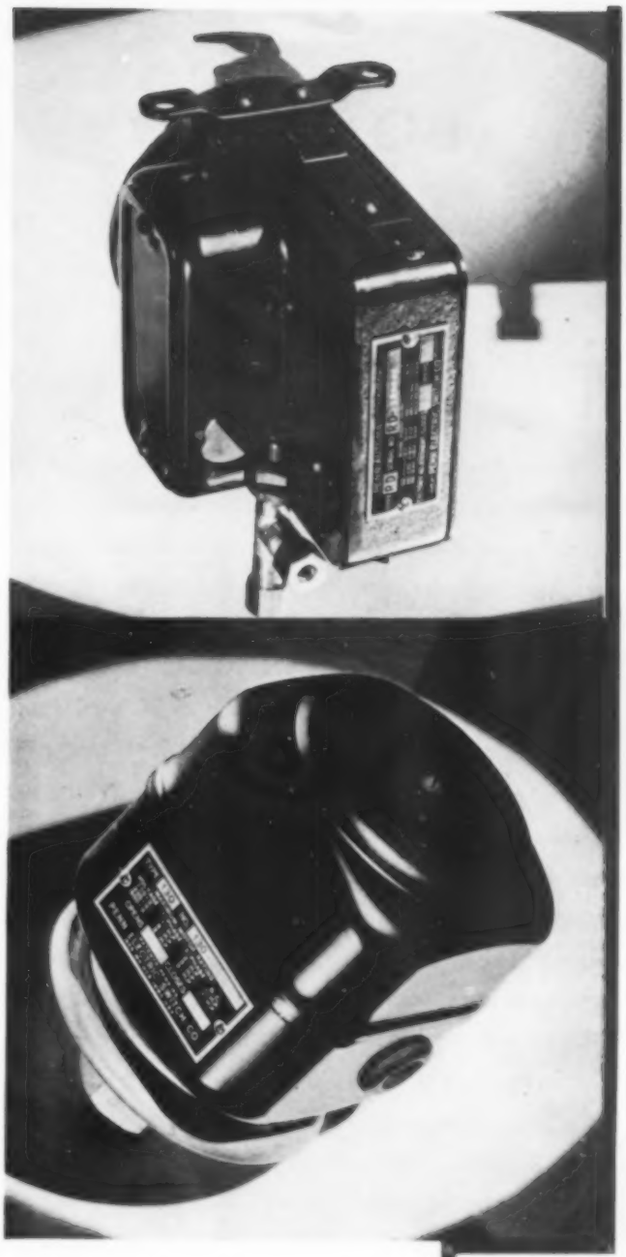
Molded and laminated plastics are cleverly combined to form this compact control...the face being a laminated blank while the body itself consists of two molded segments, whose insulating qualities have been taken advantage of in securing a more compact unit. The hand controls are, of course, molded

of the two controls at the right. The upper one occupies more than twice the space of the lower and newer model...yet both serve the same function. To quote the company, "The design is materially improved by going to a sealed case, but primarily by using a large molded block, making possible a reduction of the space occupied by the same parts. The molded material lends itself to meeting the various requirements of operation and electrical clearances and in doing it compactly." It is worth noting that the earlier model utilized some molded parts. The significant thing is that the planning of design with molding in mind resulted in pronounced advantages.

In describing the progressive improvements achieved through the use of molding, no better summation could be made than that of Nelson Delavan, Sales Manager of the Penn Company, who writes: "As the years go on, we are turning more and more to the use of molded parts to improve the appearance, reduce the bulk of a control, improve its operating characteristics and reduce its cost. Our sales curve shows the acceptance which our clients have accorded this aggressive attitude and the advantages we have offered to them."

That planning for full utilization of plastic advantages pays is an axiom demonstrated not only in the particular field of this company's endeavors, but throughout all industry Instance after instance could be cited in which the redesign of products which already utilized plastics, resulted in a marked sales increase...largely because the redesign involved the utilization of an increased number of the functions of plastics, as outlined by Mr. Delevan. The unusual factor, in this instance, is found rather in the fact that here, within a single company we find evidence of a successful attainment of full utilization of plastic advantages, achieved through conscious planning, over a period of years.

Credit, To the Richardson Co. for molding of all parts shown.



The upper and older of these controls is twice as large as the lower one...yet both serve the same function, the reduction in size being achieved partly by the introduction of a sealed case but largely by the use of a single molded block

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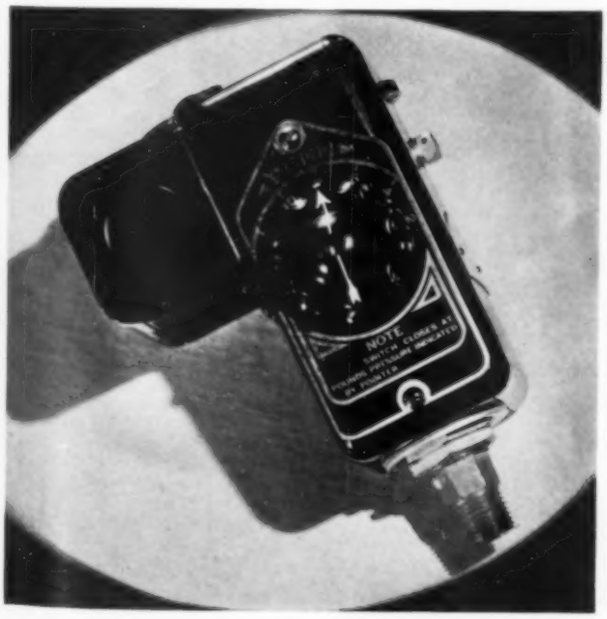


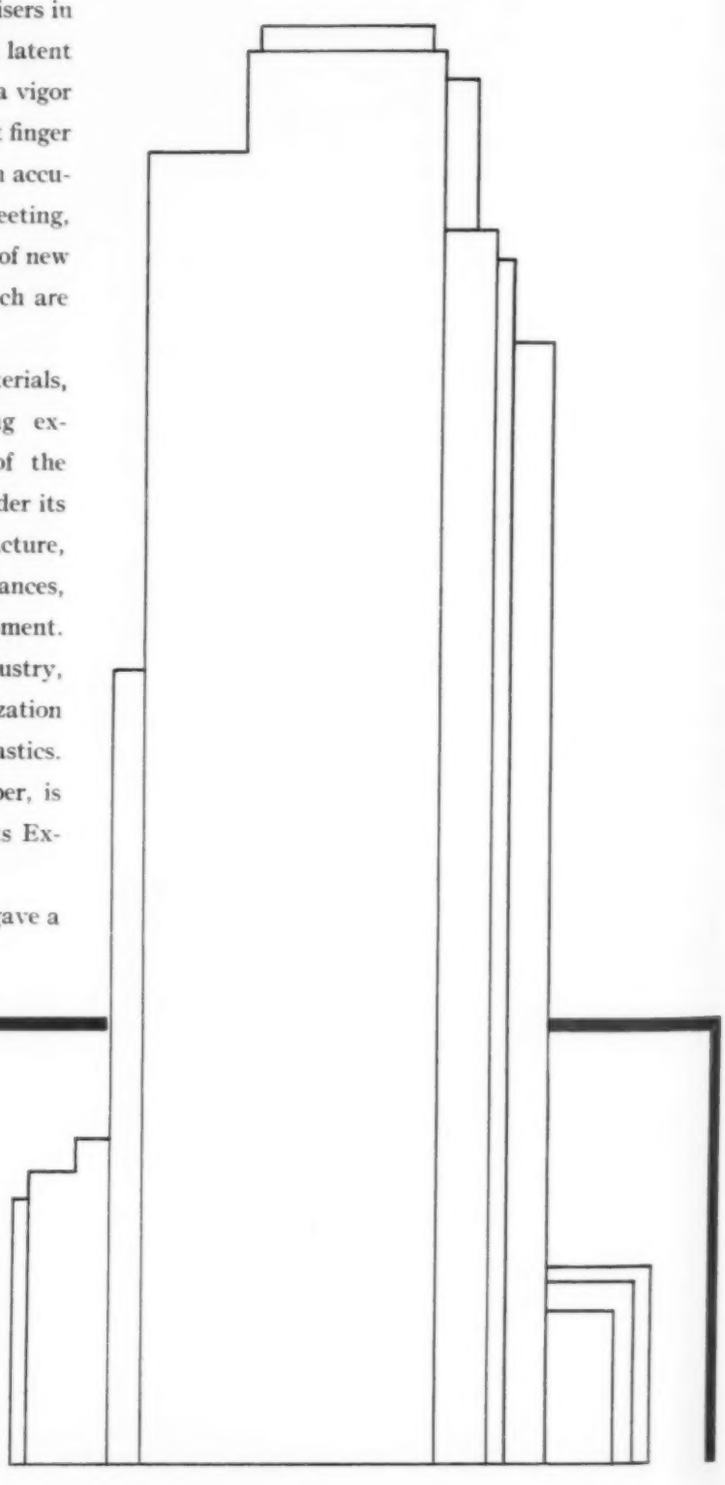
Another type of control in which molding and metals are cleverly combined to give a maximum of compactness while maintaining operating efficiency. The major part of the mechanism is here enclosed in a rectangular molded phenolic box the end of which is closed by a tight-fitting molded segment. The control knob is also molded, with a debossed arrow, wiped in in white, indicating the point to which the control is set

PLASTIC USERS LOOK FORWARD TO DUAL SPRING EXHIBITS

THE interest of manufacturers and merchandisers in new materials and new ways of using them, latent in most cases since 1929, has sprung to life with a vigor astonishing to those who have not held a constant finger on the pulse of business. New conditions and an accumulation of inventions and innovations are meeting, for the first time in years, with a resultant stream of new and re-designed products, the first waves of which are already on the market.

Serving as a focal point for such meeting of materials, methods and manufacturers, come two spring exhibits. One, the Industrial Arts Exposition of the National Alliance of Arts and Industry, takes under its wing the entire field of consumer-goods manufacture, including housing, transportation, home appliances, communication and leisure utilization equipment. The second, the Spring Exhibit of the Plastics Industry, will cover the same fields in respect to their utilization of a single group of materials, the synthetic plastics. This, like the Plastics Exhibit held last December, is sponsored by MODERN PLASTICS and is held in its Exhibition Hall at 425 Fourth Avenue, New York.

Both shows follow upon similar exhibits which gave a



EXHIBITORS OF PLASTICS
at the
INDUSTRIAL ARTS EXPOSITION

American Cyanamid Company
Bakelite Corporation
Fiberloid Corporation
General Electric Company
General Plastics, Inc.
Tennessee Eastman Company
Toledo Synthetic Products, Inc.

foretaste of the mounting interest of industry in the subjects they cover. The National Alliance show of last year, held as this one will be at the Rockefeller Center, was visited by over a hundred thousand people and resulted in the acquainting of hundreds of manufacturers with a new viewpoint toward industrial design and the planned utilization of materials...a viewpoint which has led to creation of many of the articles to be shown at the forthcoming exhibit. The First Plastics Exhibit, which, in its more limited field, attracted over five thousand visitors, has likewise awakened numerous manufacturers to plastics possibilities, will likewise have its effect on the wealth of materials and products to be shown in the Second Exhibit.

These articles are expected to number over eight thousand...to include such diversified fields as household appliances, sporting goods, building materials, electrical applications, giftware, jewelry, apparel accessories, housefurnishings, decorative accessories, etc., etc. Groupings will be by industries served and a catalog will be supplied visitors detailing and explaining the host of articles shown. It is expected that suppliers, material manufacturers and fabricators will exhibit their products. The exhibit will open on April first and will continue through May fifteenth.

The National Alliance Industrial Arts Show, from April fifteenth to May fifteenth, will occupy the Rockefeller Center Forum. Here, over forty-four thousand square feet of space, will be grouped the displays and products of every important industry serving the purchasing public with industrial merchandise. A special section has been reserved for exhibitors of plastics, space allocations having been made to a number of the leading firms in the industry.

Dedicated to demonstrating modern industry's solution of the practical, artistic and social needs of the average man, the exhibition will constitute in effect a review of the arts of modern civilization wherever they touch directly upon the life of the individual—from his toothbrush to his runabout airplane.

The National Alliance of Art and Industry announces the purposes of the exhibition as follows: "First, to bring before the public the outstanding accomplishments of American industry; second, to show how these industrial projects improve living conditions and make for fuller lives in the lower income groups; third, to encourage experiment and the use of new materials in industrial production; and fourth, to demonstrate that beauty and utility are now determining factors in the minds of all types of consumers."

A banquet, attended by 1000 outstanding industrialists, will open the exhibition. Conferences, lectures and open forums on subjects related to art and industry will take place during the month. Awards will be made for design, manufacturing achievement and research. Features of the exposition will include a model of Frank Lloyd Wright's Broad Acre City, housing project models by America's principal architects, train, ship and automotive models. The entire exposition will be staged and designed under the direction of Harvey Wiley Corbett.

EXHIBITORS AT THE SECOND PLASTICS EXHIBIT

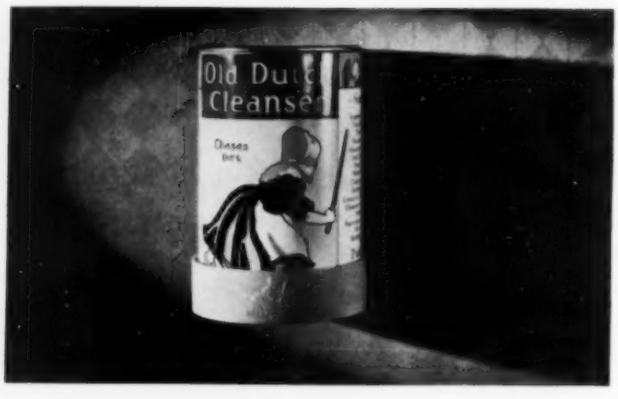
will include

Ackerman Rubber & Plastic Molding Co.
American Catalin Corporation
American Insulator Corporation
American Record Corporation
Auburn Button Works, Inc.
Bakelite Corporation
Beetleware Corporation
Boonton Molding Corp.
Celluloid Corp.
Chicago Molded Products Corp.
Diemolding Corp.
Fiberloid Corporation
General Electric Co.
General Plastics, Inc.
Kuhn & Jacob Moulding & Tool Co.
Kurz-Kasch Co., The
Makalot Corporation
Marblette Corp., The
Northern Industrial Chemical Co.
Norton Laboratories
Resinox Corp.
Reynolds Spring Company
Richardson Co., The
Shaw Insulator Co.
Siemon Co., The
Stokes Rubber Co., Jos.
Tennessee Eastman Corp.
Toledo Synthetic Products, Inc.
Waterbury Button Co.

PLASKON

HOLDER:

This time it is the new Old Dutch Holder that demonstrates how neatly Plaskon fits into the premium scheme of things. When Cudahy Company decided to offer this helpful accessory, need arose for a durable, colorful, and economical material. Plaskon's unique ownership of these qualities made it the natural choice. Today a million holders reside in American kitchens; while daily, hundreds of letters certify how welcome the holder is. And how good Plaskon is. Molded by Auburn Button Works.



LIGHTING FIXTURES:

Here is a sensational development. From this photo you get your preview of the heralded line of pastel lights. Everybody has been talking about it. No industry in the country has been more up and coming in the past year than the lighting fixture business, what with new lines being brought out by

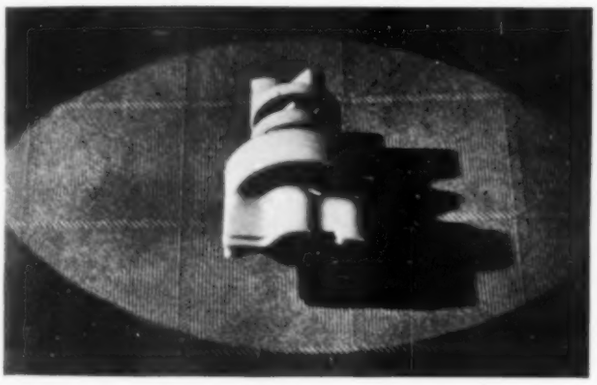
various benefactors; but the pastel lines are the last word. Others use the same old material while the Waterbury Button Company forges ahead and uses a new material, ideal in this field. Because of the high standards of color required Plaskon—molded color—was selected. Most decorative in their pure colors they also have the advantages of being strongly dielectric. They are resistant to acid, water, grease and, most difficult foe of all, time. They will not fade, peal, or craze. Watch for the photo of the full line in the next issue.

MOLDED COLOR

MARCH 1935

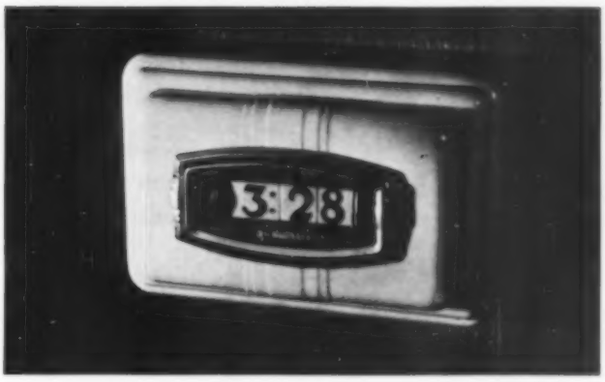
CONTROL KNOB:

As intricate a piece of molding as has come this way is the control knob on the General Electric refrigerators. Its inch and a half length measures the ingenuity of GE engineers and Plaskon's "moldability" just as its dielectric strength and its physical strength measure Plaskon adaptability for all sorts of electrical devices. Pale blue was the color selected from Plaskon's great variety to complement the pure white of the box. Molded by General Electric Company.



CLOCK CASING:

In the short span of five years it has become traditional to use Plaskon for clock casings where a colorful plastic is specified. Colorful beauty, molding precision, protective strength—all the characteristics looked for by designer, manufacturer, consumer—are best served by Plaskon. That is why the



Pennwood Wall Clock is encased in shining ivory Plaskon. Molded by Chicago Molded Products.

PLASKON PARADE:

If you are not receiving the Toledo Synthetic Products Company's magazine "Plaskon Parade", you are missing a cross section of industry's use of "Molded Color." We think it's all done in a brief, interesting manner—*and* plenty of pictures. Your request on your company letterhead will make you a regular subscriber. Free of charge, of course.

TOLEDO
SYNTHETIC
PRODUCTS
INCORPORATED

PRACTICAL PLASTICS SCORE OVER TRADITIONAL WOOD

by Gardiner Voss
INTERNATIONAL RADIO CORP.

WHEN a designer is detailed to produce an idea and present a manufacturer's article to the public, he is confronted with a task requiring no little thought and research. Indeed, he immediately finds himself plunging into a sequence of hair-tussling days and sleepless nights. Not only has he to produce a design that is tasty, in keeping with the trend and appealing to the shopping-trained eye of Mrs. Jones, but, more difficult yet, he must also arrive at one that is practical from the standpoint of ease-in-production and the adaptability to the uses to which the article will be subjected.

Beginning early in 1930 and trailing to the date of this writing, business stagnation has caused all manufacturers to possess a much keener feeling for the actual appearance of their product than ever before. Industrial designers have been sought in instances before thought unnecessary. The radio industry has been one in which there has been the keenest of such competition. Each manufacturer strives for every conceivable means to beat the other and put his product before the buying public and sell it. Directly traceable to this condition was the inception of the use of plastics in making cabinets for radio receivers.

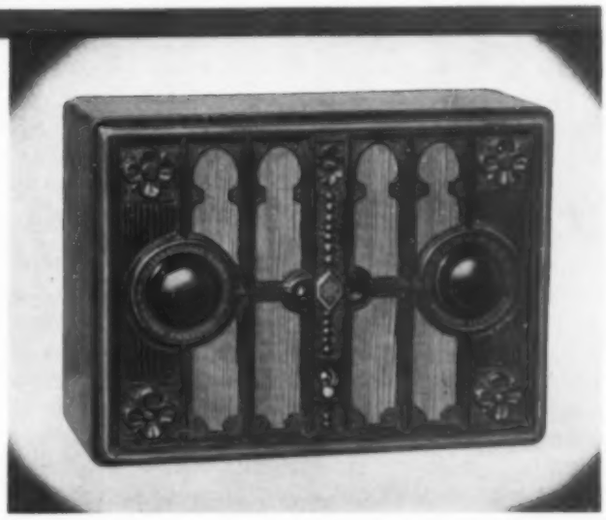
Who had ever dreamed of such a thing before? A molded material to be used in a place formerly occupied by fancy imported veneers blended together in designs after Sheraton, Duncan Fyfe, Louis XIV and other elaborate period styles. Yet, we decided that it could be used, in fact to a very definite advantage in our particular case. Radios were being manufactured for the first time of truly midget proportions, some no larger than a book. The use of a molded case increased the attractiveness of the portable feature that manufacturers wished to emphasize—by its smoothness, light weight and resistance toward marring.

Receivers of this size incidentally listed at an extremely low price. Naturally then, very little must be paid for cabinets. It was found that by the use of plastics at least a 50% saving over wood would result. It was further realized that the installation of a chassis could be accomplished in a very simple manner into a case provided with integral means for receiving machine

screws, such as tapped fillets. This would result in a labor-saving, reducing the unit cost. Last, perhaps most important, we visualized opportunities for new and distinct beauty in design. This, finally, induced us to pioneer in giving plastics a trial in a new field.

Always possessing a yen to develop something new, it was with a great deal of pleasure that I accepted the opportunity to design the first plastic radio for the International Radio Corporation of Ann Arbor, Michigan. After having drawn into consultation several recognized experts familiar with the characteristics of molded materials, the development of a design and its subsequent drawing was begun. Imagine a designer's pleasure in knowing that almost any form or amount of ornament he desired could be used safely without the worry of its being loosened or damaged by handling. So much was this realization prevalent in my mind, that no possibility was over-looked and, as a result, the first molded radio was quite ornate. Basically gothic in feeling with its pointed arch, grille openings, rosettes and beading, this model (known as the Model P, a trade notation given it due to its first being termed in the International plant the "Pee Wee") was approximately nine and one-half inches wide, seven high and four deep. The average wall thickness was but one-eighth of one inch. Tapped fillets were placed one in each of the four corners, for the dual purpose of providing means for the installation of the chassis and securing the back in place. This back, of course, was also of plastics, containing numerous holes necessitated for ventilation and for the entrance to the two pockets inside which stored the coiled power cord and antenna wire. The ease with which the receiver could be installed, as had been expected, was found to reduce the cost of this operation by fifty per cent.

By the use of varied plastics in our molds, it was possible to produce effects and color schemes which in most cases were delightful. I say in most cases because some of them were not exactly after a designer's dream for good taste. I agree with Morris B. Sanders in thoroughly disapproving of the imitation of wood effects in plastic materials. (*Continued on page 68*)



Four stages in design progress. At the right we see the Model "P", of September, 1932, approximately two hundred and sixty-six cubic inches. Immediately above is the model "A" of February, 1933, thirty cubic inches smaller than its predecessor. At the left stands the latest Kadette, the Jewel of September, 1934, which cut the original size to slightly less than half, occupying only a hundred and thirty-one cubic inches. The Model "F", an intermediate design of February, 1933, was a true pocket model, occupying only fifty-six cubic inches of space. All four of the cases shown were molded by the Chicago Molded Products Company

NEW BOOKS

● SCIENCE OF RUBBER . . . By Memmler

Reinhold Publishing Corp. ($5.00)

This seven-hundred-and-fifty-page treatise has been translated from the German by Professor Memmler, Director of the Staatliche Materialprofungsampt by R. F. Dunbrook and V. N. Morris of the research staff of the Firestone Tire and Rubber Company. The translators have supplemented the original work with additional material bringing the work up to date. Particular mention may be made of notes on recent developments in synthetic rubber, on the compounding of latex, on gutta percha, on recent X-Ray work, on the latest physical testing equipment (with particular emphasis on that of American origin) and on recently developed theories of vulcanization.

With the addition of this data, the volume becomes an authoritative and, it may be said, an all inclusive handbook of equal value to the researcher and the practical fabricator of rubber or related products. The botany, collection, preparation, physics and chemistry of rubber are covered with a precision of detail truly characteristic of the Germans, while the chapters on physical and chemical testing and on microscopy are closely related to the methods and standards in use in the English speaking world. The book is profusely illustrated and documented and there is an unusually complete bibliography and authors' index.

● SYNTHETIC ORGANIC CHEMICALS . . . Sixth Edition

Carbon and Carbide Chemicals Corp.

This seventy-eight-page brochure has been periodically issued by the Carbon and Carbide Corp. as a means of providing concise data regarding the Synthetic Organic products of its manufacture, including a number of chemicals widely used in the preparation and fabrication of plastics. Much of the information is matter that has only recently become available. Particularly interesting to plastic users will be the sections devoted to the Vinylite and Vinyloid resins, which give the physical forms in which these are available and describe the chemical and physical properties and the uses of these materials. A feature not found in previous editions is the Table of Solubility, listing the solvent power of some forty-two solvents for a dozen important gums and resins. The volume is available upon request to the Carbon and Carbide Company.

● THE CHEMICAL FORMULARY . . . Edited by H. Bennett

D. Van Nostrand Company ($6.00)

Following upon the success of Volume I of The Chemical Formulary, D. Van Nostrand Company have issued this Volume II which, like its predecessor, is a compendium of chemical formulae of every description selected by a board of one hundred and nine experts and compiled by H. Bennett. Essentially a practical man's source-book, this volume covers, in its several thousand formulae, practically every field in which chemistry plays a part, from Adhesives to Textiles, from Rubber to Animal Preparations. Of particular interest to our readers is the section on Plastics, which while in no sense a complete treatise, presents a number of facts and formulae not otherwise easily available. Sections on Rubber, Resins, Gums, Insulating and Electrical Specialties and on Protective and Decorative Coatings will also be found useful. The volume is well indexed and contains complete tables of Trade Names and Chemical Supply Sources.

● BAKELITE VARNISH—ENAMEL—LACQUER—CEMENT

Bakelite Corporation

This forty-page booklet is one of a series issued by the Bakelite Corporation, describing its various products and the methods by which they may be fabricated or otherwise utilized. This brochure deals with Heat-Hardenable Varnishes, Enamels, Lacquers and Cements. . .detailing their properties, varieties, methods of storage, application and uses. The volume is profusely illustrated and should prove of interest not only to those who are directly interested in the application of such materials but also to potential specifiers of materials and to manufacturers or merchandisers of plastic and metal articles and machines. It is available to interested parties on request to the Bakelite Corporation.

● NITROCELLULOSE LACQUER ESTERS . . . by Zimmer

D. Van Nostrand Company ($7.00)

This two-hundred-and-forty-page volume is a translation from the original German by Dr. Fritz Zimmer, chief chemist of the Eugen Schall A. G. Lacquer and Paint Works, H. K. Cameron, a British Chemist. A very extensive field is here covered in a condensed but comprehensive form, the industry being treated in a manner designed to assist the chemist and the technical worker. Technical data of the chemical and physical properties of the raw materials used in nitrocellulose lacquer manufacture, descriptions of modern manufacturing and spraying plants and consideration of the uses and possibilities of these lacquers are included for this purpose. Much of the work is acknowledged by Dr. Zimmer as being based upon observations made in 1928 in the Ford, General Motors and Duco plants in this country and descriptions of processes therefor bear particular relation to the standard American practices. The material has been brought up to date by the translator and tabulations of data on plasticizers, solvents and diluents have been added.

NEWS AND DEVELOPMENTS

The **Amerlin Corporation of America** has been established as a custom molding plant with offices and factory at 79 Washington Street, Brooklyn, N. Y. A fully equipped molding plant has been installed, capable of handling both small and large runs of various plastic molding materials. Mr. P. C. Goodspeed, formerly associated for fifteen years with the Boonton Rubber Company, is president of the new organization. The designing and engineering staff of the company is available for aid in the planning of plastic moldings.

William J. O'Neil, Industrial Designer, has taken offices at 155 East 34 Street, N. Y., where he will offer a styling service to his clients. . . .

The February and March issues of *Monsanto Current Events*, a magazine of particular interest to plastic manufacturers and fabricators, are now available for distribution. Application should be made to the St. Louis office of the **Monsanto Chemical Company.**

The popular Silex coffee-makers now boast molded phenolic collars to prevent heat transference from the hot bowl to the handle and a heat resisting molded disk to insulate the table from the electrical heating unit. Kitchen models have an all-molded pistol grip handle. Photo courtesy General Plastics, Inc.

Announcement has been made by the **Mundet Cork Corp.** (Crown Div.) that their Cincinnati office will hereafter be under the direction of Frank M. Cushing. He was formerly with the Graham organization, and more recently has been with Owens-Illinois. Mr. Cushing's territory will include southern Ohio, eastern Kentucky and West Virginia. The Mundet organization have also added Mr. Elmer Apmann to their sales forces. Mr. Apmann, a graduate of the University of Minnesota, will cover Iowa, Wisconsin and northern Illinois.

C. J. Tagliabue Mfg. Company has issued a new catalog and handbook descriptive of their "Tag" Light Beam Potentiometer Pyrometers. Both the instruments and the manner of their use in the heat control of plastic molding and production operations are fully treated. The company manufactures both indicating and recording pyrometers as well as a controlling type which regulates press temperatures within pre-determined limits. All of these instruments operate by means of a photo-electric cell and are, therefore, claimed to be more sensitive and speedier in their action than earlier types.

A measuring scoop, with cast-phenolic handle, is being used as a premium by the Washburn Company, makers of the Triple Sifter. The counter display shown above features the Catalin material used in the handle. The manufacturer reports unusually gratifying sales results and instant dealer cooperation

The Commerce Department's Chemical Division will continue the publication of import and export statements in 1935. These statements, most of which have been published for years, cover the whole range of trade in Chemicals and Allied Products, including medicinals, toiletries, drugs, coal tar products, perfumeries, matches, heavy chemicals and chemical specialties, paint products, naval stores and fertilizers. Imports and exports of each item are given both in quantity and value together with the country of origin and destination.

C. C. Concannon of the Bureau of Foreign and Domestic Commerce activities states he will be pleased to forward a catalog describing each statement in detail. Requests should be addressed to the Commerce Department, Washington, D. C., and marked for attention of "Chemical Division."

YOU ARE INVITED TO ATTEND THE

SPRING EXHIBIT

OF THE

PLASTIC INDUSTRY

to be held in the Exhibit Hall of MODERN PLASTICS at 425 Fourth Avenue, New York City, from April 1st to May 1st.

★ ★ ★

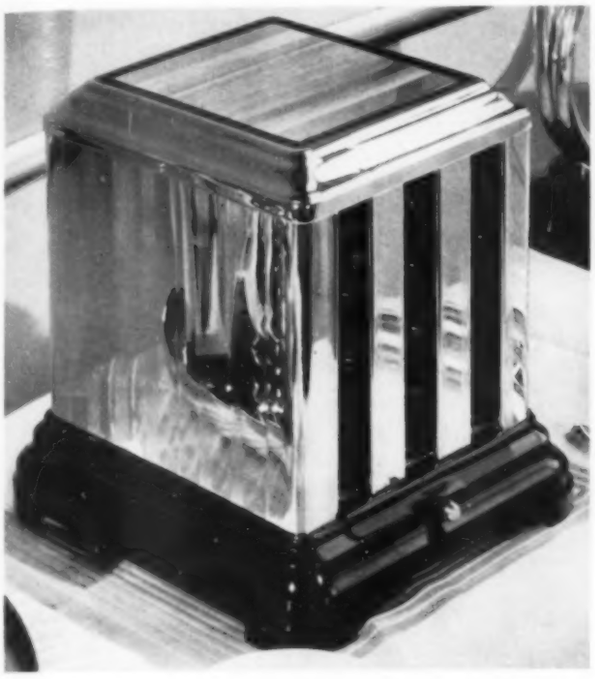
All types of materials and products, including phenol resins, cast phenolics, ureas, cellulose acetates, laminated plastics, pyroxylins and caseins will be shown. The exhibit is sponsored by—

MODERN PLASTICS

425 FOURTH AVENUE

NEW YORK, N. Y.

The Industrial and Chemical Engineering Division of the **American Chemical Society,** at its forthcoming meeting early in April, in New York City, will hold a symposium on Materials in the Building Construction Industry at which the use of plastics in this field will be discussed. The papers read at this meeting will be republished in *Industrial and Engineering Chemistry* and in the *Bulletin* of the Engineering Experiment Station of Ohio State University.



The Samson-United Corporation have recently announced the TRIMATIC Toaster, which accommodates three slices of bread. It is completely automatic in operation, equipped with a timing device so that toast may be prepared to meet individual tastes. It is constructed from brilliant chromium plated metal, and a sturdy molded base in black, providing beauty to grace any home. Photo, courtesy of Bakelite Corporation

Reading of multiple-point instrument records is greatly simplified by a new system of "numerals in colors" introduced by **Leeds & Northrup Company,** Philadelphia. This marking system can be specified on Micromax strip-chart recorders for 2, 3, 4 or 6 points. With each of the thermocouples, resistance thermometer bulbs or other primary elements identified on the chart by a numeral, and each numeral distinguished from the others by being printed in a contrasting color, reading of records is made easy, errors are avoided and time is saved. Colors used for printing the numerals are: black, green, red, violet, yellow and blue.

The Fifth Annual **National Premium Exposition** will be held at the Palmer House, Chicago, during the week of May 6, under the sponsorship of the Premium Advertising Association. Both space allocations and admission tickets may be secured through A. B. Coffman, Exposition Manager, Merchandise Mart Chicago.

Synthane Corporation announces that J. B. Rittenhouse, vice president, has transferred his headquarters from Chicago to the main office of the company at Oaks, Pennsylvania. Mr. Rittenhouse has been associated continuously with the laminated bakelite industry since 1916, and with Synthane Corporation since its inception in 1928.

During recent months the company has introduced its materials for radio dials in addition to the older established radio uses such as coil forms, sockets, panels and insulation. Of considerable interest in mechanical fields is the increasing adaptability of its products for use as non-metallic containers, buckets, tanks, etc., where resistance to corrosive liquids is important.

Two new descriptive booklets, describing the construction, specifications and use of Raymond Roller Mills and Raymond Screen Mills, respectively, have been issued by **Raymond Brothers Impact Pulverizer Co.** of Chicago. Both are available on application to the sponsors.

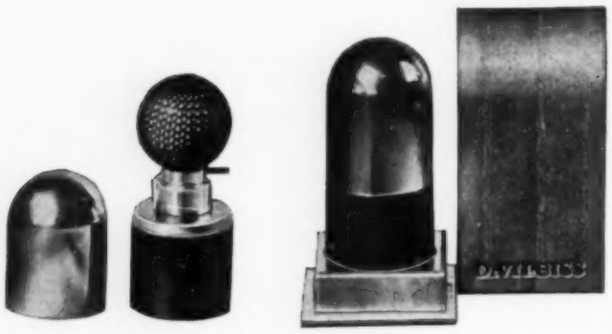
Boonton Molding Company has just issued a folder descriptive of its work done for the C. J. Tagliabue Manufacturing Company in the molding of eight intricate parts for the latter company's Snapon Temperature and Pressure Controls. The company also has recently published a handbook on the characteristics and use of plastic materials entitled, "A Ready Reference for Plastics." Copies of both pamphlets are available for distribution.

Total earnings of the **Monsanto Chemical Company** for 1934, including its proportion of the undivided profits of controlled companies not consolidated, and uncontrolled companies, were $2,771,629.29 or $3.20½ a share on the 864,000 shares outstanding, according to Edgar M. Queeny, President. Of the total earnings, $2,638,040.17 or $3.05 a share resulted from operations of the parent and wholly owned subsidiary companies. Earnings for 1933, after giving effect to the 100% stock distribution of last April, amounted to $2.57 a share.

The **Knapp Monarch Corporation** has recently produced two electric toasters, of new design by Max Jules Gottschalk, which utilize small pieces of punched plastic material as handles for the hinged toast-holding trays.

The synthetic resin industry of the United States has now reached the point where it ranks as one of the country's important manufacturing enterprises, according to C. C. Concannon, Chief of the Commerce Department's Chemical Division. Originally an American achievement, he pointed out, the United States leads today in the chemistry of synthetic resins and is the world's largest producer and consumer. Production of synthetic resins of coal tar origin increased from 1,500,000 pounds in 1921 to 41,628,500 pounds in 1933, official figures show.

Unusual interest is being displayed in the new Rubber Powder developed by the **Heveatex Corporation** of Melrose, Mass. This new rubber powder may be obtained in any formulation suitable for numerous purposes, such as direct molding without the necessity of mastication, etc.



The DeVilbiss Company is featuring this purse-size perfume atomizer utilizing a cast-phenolic base. The item, designed by the company's art department, is so constructed that all possibility of leakage and evaporation is overcome when the metal cap is in closed position. The material, used in a number of colors, is Marblette

The **Formica Insulation Company** has issued a portfolio illustrating the work of leading American designers and architects who have used Formica for interior decoration and furnishings, particular emphasis being laid upon the utilization of this material in the construction of bars, store and restaurant fixtures and table tops. The portfolio, titled "Splendid Places," is profusely illustrated and includes such installations as those made in the Hotel Plaza, New York, The Park Plaza Hotel, St. Louis, The Brevoort Hotel, Chicago, The Casino Club, Chicago and the Carlton Hotel, Washington. Copies may be obtained by application to the Formica Company.

The annual report of the **Westinghouse Electric & Manufacturing Company** for the year ended December 31, 1934, just released, shows a net income earned of $189,562. This compares with a net loss of $8,636,841 reported for the year 1933. These results are after provision for depreciation and other reserves.

In the report, A. W. Robertson, Chairman of the Board, and F. A. Merrick, President, say in part:

"Sales billed for 1934 totaled $92,158,893, compared with $66,431,591 for 1933. This is an increase of 39%.

"Better business was reported by all principal divisions of the Company and billings for the year were substantially above 1933. The total, however, still was only approximately 50% of the average volume in the years preceding the depression. Therefore, operations were burdened with the fixed expenses of a large unused plant capacity. Plants of the Company that produce the heavier apparatus normally required by the electric utility companies have operated throughout the year at a load much lower than the 50% average.

"Since 1929 Westinghouse has suffered in common with the entire electrical manufacturing industry from the severe recession in business activity; but it has been able to maintain, and in some directions to improve, its relative position in the electrical field. As business recovery progresses the present capacity of the Company will be drawn upon for productive use, with consequent benefit to operating results.

"The Engineering Department and the Research Laboratories of Westinghouse have continued their effective contributions to the position of the Company. While the year's work has included few spectacular developments, much has been accomplished in the way of improvements and refinements in existing lines of apparatus.

"An appreciable part of the increased booking this year is directly attributable to developments of both new purpose apparatus and apparatus to accomplish old purposes in better and more economical ways."

Syntron Company, manufacturer of pulsating electro-magnetic vibrators and hammers, has developed a purely vibratory dry feeder machine, designed to provide a dependable, constant flow of dry powdered material. The equipment as illustrated consists of a vibrating feeder trough fed from a vibrated hopper.

The volume of flow of material through the feeder trough is regulated electrically by a dial rheostat, controlling the current input to the feeder vibrator.

The starting and stopping of the flow is instantaneous, giving a very accurate control of the volume of material desired for a given purpose by the opening of the circuit, there being no momentum to overcome. Once set the volume flow remains constant. A steady, smooth discharge from the hopper into the feeder is insured by a small vibrator on the hopper that keeps the contents agitated to prevent arching and sticking. The capacity can be varied to feed from 2 ounces to 2000 pounds per hour and the current required for operation is less than 200 watts per hour. A low hum is the only indication of the machine in operation.

The major advantage of this vibratory type of feeder, in addition to its electrical control and con-

Transparent TENITE

In these Willson safety goggles, molded by the Shaw Insulator Company, Tenite provides the safety factors of transparency and high shock resistance. The extreme toughness of Tenite is shown by the fact that the cups are punched and sawed after molding. Write today for samples and an illustrated book on the uses of Tenite.

TENNESSEE EASTMAN CORPORATION *(Subsidiary of Eastman Kodak Co.),* **KINGSPORT, TENN.**

stant volume of flow, is the absence of all wearing parts, such as motors, gears, bearings, connecting rods, slide valves, etc., no lubrication being required as all movement is through flat leaf springs and live rubber.

Full catalog information can be secured by writing the Syntron Company.

MODERN PLASTICS
New York City
Gentlemen:

I have your letter of the 23rd, and I fear that you have gotten the wrong impression from my first letters.

I do not wish at all to question the use of phenol-resins for toilet-tank valve assemblies. Neither do I wish to raise any question as to the respective merits of these materials as compared with Hard Rubber for such use. My own personal opinion, of course, would be that Hard Rubber is better fitted for this work. However, you have made a definite statement in your magazine as follows:

> "Because Hard Rubber parts have a tendency to soften, these toilet-tank valve assemblies are now moulded of phenol resins, their water resistance assuring the constant dimensions necessary for proper functioning."

This naturally infers that Hard Rubber will soften, is not water resistant and will not assure the constant dimensions necessary for proper functioning when used as toilet-tank valve assemblies. This is *positively untrue*, and a statement which I feel I must ask you to correct. Hard Rubber is softened by the application of heat, but the heat necessary to soften is not encountered in toilet-tanks.

In reviewing a paper issued some time ago by The Celoron Company of Bridgeport, Pennsylvania, signed by G. E. Landt, Chief Chemist, I find they specify the water absorption of Hard Rubber immersed for 24 hours to be 0.02%, while moulded Celoron is 0.05 to 0.2. Also, they specify that Hard Rubber is not affected by alkalies while moulded Celoron does not successfully resist the action of alkali unless very dilute and is completely destroyed by strong caustic alkalies.

I am giving you these figures not with any idea of controversy, but merely as you asked for specific data. I felt it would be better to give you the opinion of the Chief Chemist of The Celoron Company rather than our own opinion or tests. Of course, moulded Celoron may be entirely different from the phenol-resin spoken of as being used for toilet-tank assemblies. However, if my knowledge is correct, I believe moulded Celoron would be classed as a phenol-resin.

As above stated, my only concern is that I feel you should not let the untrue statement concerning Hard Rubber go by without being corrected.

Cordially yours,
H. E. CASE
The Luzerne Rubber Company

NEW FIELDS TO PLOW

(*Continued from page 27*) in one simple operation except the trigger held in place by a metal pin.

The more sophisticated cocktail shakers at the show wore plastic handles for convenience in pouring and were topped with plastic knobs of varying shapes and hues.

Twinface and Twinmill Clocks, made by Twinface Clock Company of New York, got plenty of attention—and sales. They have gained much popularity in recent weeks in the better shops throughout the land, and have been featured by Vogue and other leading women's magazines. Electrically driven, they are substantially constructed with a variety of well designed cases of plastics and metal Being two-faced, they are ideal for light stands between twin beds, or for the living room or office desk where the correct time is always visible from any angle you choose to look.

Italian Crafts of New York have a mighty fine pair of Cornucopia Book Ends molded of "Marblite" in true classic design. They have the weight and feel of real marble, yet are popularly priced.

Hannah Porter of New York has combined plastics with thread-spun Duralium in a manner to lift her products completely out of the ordinary and place them in a niche uniquely their own. Pastel shades of cast phenolics are in such close harmony with the soft chemically colored metal that they appear to grow there. Ball shaped powder boxes of copper color have bands of palest green and ball knobs of canary yellow. Flower bowls and humidors of walnut, inlaid with maple, stand proudly on solid balls of harmonious plastic, used as feet. Duralium tumblers which frost enticingly when filled with Julep have plastic rims that are smooth and inviting to the lips. Lamps, trays and flower holders are equally in good taste. Even the more ordinary red and black plastics as they are used here look different. Duralium is a non-toxic silver colored metal whose finish, like that of plastics, never changes. It is chemically colored in many shades, and some of the pieces are decorated with several hues in rainbow fashion. Candy boxes and powder boxes, in quantity, can be produced economically enough for manufacturers to adopt them as re-use packages. At no place in the show did I see plastics more intelligently used than here. Hannah Porter products are designed and produced in a model workshop on the Porter farm at Northport, N. Y.

Plastics, this exhibit proves, are definitely established in the Giftwares field and are doing their share to revive the industry on a sound and permanent footing. There are many opportunities in this fertile field for molders with imagination. Manufacturers are in a receptive mood and hungry for ideas in which they can use plastics to further their plans. Too few of them understand the material but they appear anxious to learn. A little missionary work in this field by those who make plastic materials suitable to its use should be highly profitable.

RESINOX CORPORATION

(SUBSIDIARY OF COMMERCIAL SOLVENTS CORPORATION AND CORN PRODUCTS REFINING COMPANY)

MANUFACTURERS OF SYNTHETIC RESINS AND VARNISHES

PLANT
EDGEWATER, N. J.

NEW YORK CENTRAL BUILDING
230 PARK AVENUE
NEW YORK, N. Y.

TELEPHONE
VANDERBILT 3-9300

February 27, 1935

Mr. [redacted]

Dear Mr. [redacted]

We were surprised to learn from your letter of February 25th that the reason we have been able to secure such a small part of your business on molding powders is due to your feeling that we are not in a position to offer a complete line of molding materials. That you should have gotten this impression is certainly our fault, and I am taking this opportunity to correct it.

We manufacture, and offer for sale, a full line of resins and molding powders. Over a dozen Resinox resins are available, and from these we make numerous grades of molding powders. Of course, we have a molding powder for general use which is available in black and brown, and in various plasticities. We have found that this general purpose Resinox molding powder will work satisfactorily on at least fifty per cent of the jobs in the average molding plant.

Among the other types of molding powders which we are producing, you will find heat-resistant materials, water-resistant materials, and molding powders from which odorless and tasteless articles may be made. Also, for difficult extrusion jobs, we have a special compound of such great flow that it is particularly adapted for this type of work.

Resinox molding powders, including those which are odorless and tasteless, are available not only in standard blacks, browns, and other brilliant colors, but also in delicate pastel shades, and in a particularly beautiful ivory.

We should be very glad indeed to have one of our service men call upon you and give you full information on our complete line. Samples, too, are yours for the asking, and don't forget that we welcome special problems which may require special types of molding materials.

Resinox is growing up in every sense of the word, and we have several new developments coming along which we believe will be of particular interest to you.

Yours very truly,

C. L. Gabriel

C. L. Gabriel
President

/MJ

RESINOX
Molding Resins • Molding Compounds
Laminating Varnishes

CAST PHENOLICS AS DECORATIVE MATERIALS FOR THEATRE ARCHITECTURE

(*Continued from page 13*) The service bar, as you probably know, is built in two separate sections; the front section, on which drinks are served, and the back section, which is against the wall and which has shelves below the table level for bottles and glasses, and which is usually topped by a wide mirror or glass panel attached to the wall. This panel is called a fascia. On either side of it are wide mirror panels, making the whole bar seem longer, of course, than it really is.

The fascia of the twenty-one foot scarlet bar, constructed entirely of alternating stripes of orange and red catalin glued together with joints which overlap for the full length of the stripes, is set in a chromium frame which runs all the way around it. In the center and in front of the fascia is a solid Catalin column 2″ x 2″ x 6′. This column is illuminated by means of a Neon tube which is completely imbedded in the center of the column. The entire column emits a brilliant reddish-orange light and stands out in front of the Catalin-Neon illuminated fascia. Back of the sheets of Catalin, in the three-and-a-half-inch space between them and the wall, are neon tubes of light, which, shining through the catalin fascia, give the thing the appearance of "wavy" material as supple as velvet and as richly soft

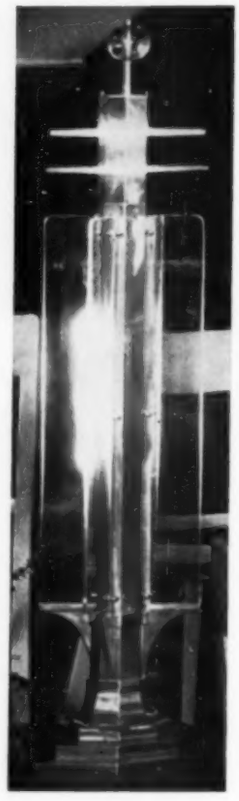
Above are seen two of the lighting fixtures detailed in this article

as scarlet satin. The orange stripes, which are clearly visible in daylight, look like lighter shades of red at night with the light behind them.

The shelf of this back bar is formica, on wood. Its lodge is chromium. Formica forms the front of it, and Monel metal the base. A chromium finial at the top gives a smart finish to the fascia as a whole.

The front bar, the one seen by the audience, is again of cast phenolics. Contrasting with the dark mahogany shelf, is a solid front of scarlet catalin, banded with the triple narrow chromium strips referred to above. Back of this scarlet catalin apron, between it and the wood body of the front, run neon tubes, again giving an indirect lighting effect like that of the fascia. A marble step at the base of the front bar takes the place of the familiar brass rail.

This catalin "apron" was poured in pieces of lengths varying from two to seven or eight feet in length, and then assembled completely at the theater. Of course, had the material warped or been untrue to specifications, the entire bar would have been ruined or its construction held up until new pieces could be cast. But, fortunately, not a single mishap occurred. Even the curved sections forming the ends of the bar were



cast at the factory of the Catalin Corporation, and arrived in good condition, ready to be attached to the flat panels forming the front of the bar. The Catalin Corporation has a Department which specializes in the applications of Catalin in the illuminating field. This department is fully equipped even to the extent of having a complete Neon tube-making plant.

Jacob Froehlich Cabinet Works and Lansha Studios, in the Bronx, specialists in bar construction, were the persons directly responsible to the Lamb Company for this bar and its giant brother on the mezzanine.

The accompanying sketch, a cross section through this service bar, shows its construction.

The fifty-foot bar, on the mezzanine, known as the Marionette Bar because of the clever recessed scenes with marionettes in miniature settings in the walls around the mezzanine, is built of similar materials and in a way very similar to the smaller bar on the entrance floor. The mezzanine bar, however, is built around three giant pillars, so the surface of the fascia is curved rather than fundamentally flat. Again the front of the forward bar is of scarlet Catalin, banded around the center with the three narrow parallel bands of chromium used as decoration on the smaller lobby bar. Back of this, too, is a trio of neon tubes lighting the front indirectly as the light shines through the translucent cast phenolics material.

This bar has a chromium foot rail instead of a marble step. But it, too, has a mahogany counter. The back bar again is faced with black formica on wood, and its counter is of black formica, as is the one downstairs. Instead of a Monel metal footboard, an aluminum one is used on the back bar.

Against the mirror fascia of the back bar is the unusual "fountain" decoration of glass tubing bent in loops mounting higher and higher like the waters of an elaborate fountain. This tubing, also lighted with neon, is, as we mentioned, the only conspicuous decorative feature in the French Casino made of glass and not of cast phenolics.

Lighting fixtures of cast phenolics also have been used in the "transformation" of the Earl Carroll. Three types were specially cast. Overhead fixtures for the ceiling over the Marionette Bar, with horizontal plates of Catalin joined to a central chromium channel flanked

with lights on either side. Floor lights—small pedestals standing about three and a half feet from the floor, on either side of the entrance to the balcony from the mezzanine in which is the Marionette Bar. And vertical tube lights, placed in two groups of three each in graduated heights against the outer side of the balcony. These vertical lights range from two to eight feet in height, and are placed at the intersections of the arcs in the curving front of the balcony. Each has a series of tube lamps inside it. The first of these vertical lights were cast in sections. The prospect at this writing is that these will be replaced by new fixtures of cast phenolics in the same shades of orange, cast entirely in one piece, and set in a chromium base as are the present fixtures.

The floor lights deserve special mention. They were used instead of overhead lights because the ceiling over that part of the balcony was a bit low. Or, in the words of the architect, "The sloping shape of the partition dividing the cocktail room from the lounge made it necessary to use floor lights which would give all the head room possible and would create an impression of height to the enclosure around the entrance to the balcony lounge.

The lights are simply, yet effectively, constructed. Around a central hexagonal tube of chromium, Catalin plates in vivid orange are inserted, vertically, at right angles to the tube so that the light emerges from the fixture in several directions at once. At the top of the fixture are three horizontal Catalin discs to scatter the light over a wider section of the floor and diffuse it upward as well.

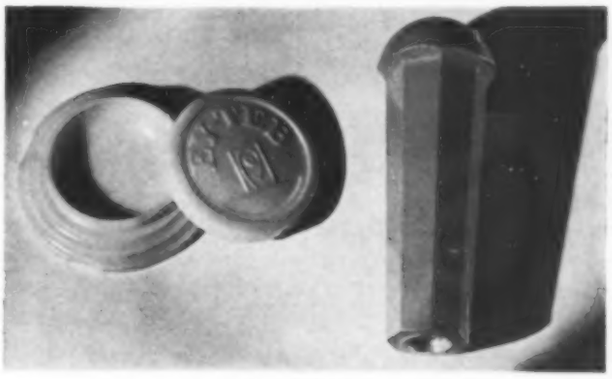
A still different use of Catalin is shown in the facing of the stainless steel channel letters in the display sign, "French Casino," with orange Catalin. Again it was used where color was needed—color in a material translucent enough to permit the passages of light through it. Here the letters are made in the conventional way, with neon tubes in the steel channels in the body of the signs.

Undoubtedly, other theaters will imitate the successful effects gained through the use of cast phenolics in the decoration of the French Casino. The Paramount Theater Building, in New York, is at the present time, testing a new exterior sign whose letters will be faced with Catalin in brilliant, translucent color. And, similarly, night clubs will follow the example of this gay rendezvous in achieving startling color effects through the use of light back of translucent cast phenolic materials. The field is new, and fertile. The materials are adaptable and not over-expensive. And the color range obtainable in cast phenolics at the present time is almost unlimited.

WATERBURY LEADS IN MOLDED PARTS

By virtue of their long years of experience and list of satisfied customers rightfully allows them to fulfill this position.

Parts molded to your specifications of *Bakelite*, *Durez*, *Beetle*, *Plaskon*, *Unyte*, *Tenite*, and *Shellac*.



We can take care of your every need. May it be a Cap, Container, Box, Radio Cabinet, Stove Handle, or Electrical Part.

THE WATERBURY BUTTON CO.

PLASTIC DIVISION

EST. 1812

WATERBURY, CONN.

PLASTICS' STAKE IN SIMPLIFICATION—STANDARDIZATION

by Waldon Fawcett

Waldon Fawcett's experience in the interpretation of governmental and legislative enactments, in their relation to industry, eminently qualifies him to discuss the questions of Standardization and Simplification. Some industries find the organized administration of standards indispensable... while in others the word is anathema. We would be glad to hear from our readers their views on the desirability of this work, in all or part of the plastics field. *The Editors.*

MAKE the bald statement that the plastics community has a considerable stake in the rejuvenated program of Standardization and Simplification in industry and one has only said what might be asserted with equal truth of other industries. Of almost all industries, indeed, the products of which are put forth in terms of selective molds, patterns, diverse varieties and graduated sizes. But, time this news to the approach of business to the first quarter pole of 1935 and it takes on a particular meaning.

The organized movement, within and without plasticdom, for systematic product-unification and -concentration has suddenly gained in stature because it is a part and parcel of the new spirit in business and the attendant new formulas of competition. You may place the credit (or the blame) where you please. On the NRA; on the new ideas of self-government of business; on tacit suspension of the anti-trust laws; or where not. The fact remains that Codes and cost sheets have operated to remove some of the grief from diffuse production and uneconomic marketing. And the scheme for concerted banishment of odd sizes and poor sellers is right in the midst of the voluntary regimentation.

What with the emphasis on the NRA, and the New Deal in general, it is perhaps natural that the impression should sink deeper than ever that Standardization and Simplification are twin pets of the Government. Yet it is rather important that this suspicion be punctured, or modified, before we examine the current status. As to both "causes," Uncle Sam is an educator and a missionary rather than a dictator. The composite old gentleman at Washington is a firm believer in the principles of cooperative control of commodity dimensions, etc., and is willing to promote evangelism at his own expense. But he is not attempting to force either standardization or simplification down anybody's throat. The role of the Federal mixer and greeter, known officially as the National Bureau of Standards, is that of a go-between—getting together the forces of industry and helping to compose their differences but yielding to the parties at interest when it comes to working out specific details.

Common Misapprehension No. 2 is the assumption that Standardization and Simplification are one and the same thing, that the terms are interchangeable. As a matter of fact the two objectives are separate and distinct. "Standardization" is primarily technical and creative. Its function is to determine and establish in use the best design, quality, method or process for a given item. In short, to set the fashion by establishing a standard.

In contrast to this concept, Simplification is chiefly concerned with distribution. Its function is to determine which sizes of a product or items in a line are most important and to concentrate on them in marketing. Simplification may be applied to articles already standardized as to size or design. Or it may be applied to pave the way for standardization. Complete team-play is so essential for the success of any adventure in Simplification that banishment of non-essentials is seldom attempted unless assurance is forthcoming of voluntary support by at least eighty or ninety per cent of an industry.

Plastics occupy an unusual if not unique position in respect to Standardization and, in even greater degree, with respect to Simplification. Conceding all the economic advantages, the fact remains that any device for regimentation is likely to prove a doubtful blessing if it operates to curb the free play of originality and ingenuity in design and fabrication. The very life blood of the plastics industry consists in invention and the capitalization of novelty. Artistry of expression in line and form, sensationalism in the application of color, clever utilization of the very qualities which set the medium apart from all others—these are precious assets in trade rivalry where honors notoriously go to the candidate that is not only smart but "different."

An alibi is handy for the proponents of industrial rationing. They insist that neither Simplification nor Standardization contemplates the destruction of originality in industrial output. Let me repeat the illustration which is most often trotted out when misgivings are voiced. Federal promoters of the simple life point out that a line of plastic containers might be closely snuggled as to sizes (or capacities) without in the least cramping the design style, or the color palette of the creator. They add that never in their most fanciful dreams have they had any thought of enforcing conventions upon objects or receptacles or closures, which, through use or exploitation, serve the purposes of a trade mark or badge of ownership.

Far from admitting that Simplification and Standardization are brakes upon (*Continued on page 69*)

BARRETT FIGURING MACHINE NOW USES MOLDED CASE

The new Barrett Figuring Machine is a small, light, compact unit operating through a standard keyboard. Its operation requires no skill or experience. The lustrous black molded case is an innovation and replaces the conventional metal housing.

The advantages claimed for the molded case are greater savings in production costs, and additional sales appeal. It would require nine production operations to produce the case of metal—blanking, forming, trimming, grinding, sand blasting, phosphate finishing, scratch brushing, japanning and baking. Only two simple operations are necessary with the molded case—molding and removing fins. The molded case also does away with costly recutting operations necessary to make the case fit the base, for the molded housings are uniform and require no refitting operations.

The manufacturer claims that the lustrous long-wearing finish is an excellent sales advantage—the machine will never lose its attractive appearance no matter how hard it is used. In addition, the molded case performs the important function of deadening the noise of the machine while in operation.

The Barrett Figuring Machine does not require paper nor ribbons and the cost of operation is very low. A novice, without previous experience or training, can operate it with great speed and accuracy.

Although placed on the market but a few weeks ago, this reasonably priced machine seems destined for success. Several thousand have already been sold in England—selling over domestic British makes, despite import duties and added transportation costs.

The machine is manufactured by the Lanston Monotype Company. The case is molded of Durez by the Kuhn and Jacob Moulding and Tool Company.

MOLD COSTS Can be Cut 50% (and more)

Heater Cord Connector Punch above (two-thirds size) of Nitralloy, formerly took 50 hours. Now 18 hours on Gorton Duplicator plus 18 hours preparatory shaper and milling operations and final polishing.

A serious draw-back to more profitable production of plastic products is the high cost of multiple cavity molds made by usual tool room methods.

The new Gorton Duplicators provide a means for cutting duplicate mold costs *in half*. Again and again, under actual operating conditions, Gorton Duplicators have cut mold production time *in half*, *cut costs fifty percent and more.*

Investigate these unusual new machines. Clip the coupon below: mail it, today.

Send for TRADE MARK GORTON RACINE, WIS., U.S.A. **Bulletin**

George Gorton Machine Co.

1100 13th St. Racine, Wis.

Send me your bulletin on Die and Mold Duplicators.

Name _____

Company _____

Address _____

WHICH PLASTICS TO CHOOSE? VII

This is the last in a series of articles describing the various plastics and telling about their applications. Previous articles dealt with the phenolic, urea and cellulose acetate, cold molded and cast phenolic and pyroxylin types of plastics.

MISCELLANEOUS PLASTICS

by Herbert Chase, M.E.

IN preceding articles of this series the plastics which have attained greatest commercial importance have been discussed and their qualities pointed out. In addition to these plastics there are several others each of which has certain properties which adapt it for special applications. Some of these have seen and still see extensive commercial application. Others are decidedly limited in their uses because of high cost, certain limitations in adaptability, insufficient development or some other factor which may or may not be overcome in the course of future development. Low first cost is always a factor in the selection of plastics, as with other materials, and this cost often varies greatly with changes in the cost of the raw materials employed. This in turn changes not only with general market conditions but with technological improvements which sometimes make a material which is quite expensive today very much less costly tomorrow. There is always the possibility that some such development may change the entire complexion of the plastic industry. It is always true, however, that many other factors, besides first cost, control the selection of materials of all kinds and that some material will be sold at almost any price if it does a particular job better than any other material available. This is the case with certain plastics.

Among synthetic plastics not considered in earlier articles of this series, the vinyl plastics are perhaps the most important although they have not yet attained a very wide commercial use. In general appearance as well as in some properties they resemble the pyroxylin and cellulose acetate plastics and sell in about the same price range. Thus they are available in nearly all degrees of transparency and in almost any color desired. They are odorless, tasteless and chemically inert and in most cases are non-inflammable. They are permanently thermoplastic, that is, they are softened by heat, as for molding, and can be softened again after molding by another heat application. The softening point ranges from about 122 to about 158 deg. F., in the case of Vinylite, which is one of very few vinyl resins to see commercial development in this country. Other makes have been developed in Europe and some work with them has been done by at least one Canadian manufacturer.

Vinylite resins are highly resistant to water absorption, especially in their unfilled form, and are good electrical insulators. Successful molding is done by the makers of this material but it has not been made available to custom molders generally. To date its chief commercial uses, so far as plastics are concerned, have been in the manufacture of gramophone records and in the making of dentures. The material has

Group of insulators produced by the Insulation Manufacturing Company from a shellac composition called Electrose. These insulators are mostly for use on high-tension circuits. The variety of metal inserts employed is noteworthy

been made up, however, in the form of sheets and has been extruded into rods and tubes. It has also been used, at least experimentally, for laminating onto wood and composition materials. Its chief disadvantage is, perhaps, its rather low softening point. Some molding of the injection type has been done with vinyl resins in Canada and Europe and it is believed that this type of material may attain wider use as it becomes available for injection molding in this country.

Among the natural products, used for molding purposes, not previously treated in this series of articles, shellac is undoubtedly the most important. Prior to the general introduction of phenolic resins its use was more extensive, but it has not been entirely displaced by this and other forms of resins because of certain qualities peculiar to it. Certain of its properties have been greatly improved as a result of considerable research work in recent years. Being a natural product, produced largely in India under conditions which vary somewhat, its qualities vary to some extent and it can be had in different grades. It is molded chiefly by specialists who, as a result of long experience, are able to produce a product of reasonable uniformity and giving excellent satisfaction for particular purposes.

Products molded from the rubber-base plastic termed Plioform. This plastic, which is not vulcanized and contains no sulphur, is available in a wide variety of colors, including some giving pearlescent effects and differing degrees of translucency. It is a product of the Goodyear Tire & Rubber Company

Shellac is used in molding chiefly for the manufacture of electrical insulators, especially for high-voltage use, and for making gramophone records. Certain parts used in automatic telephone exchanges are also made from shellac where it has proved to be the best material yet found for this particular application. Insulators molded from shellacs are employed for high-tension transformer terminals, among other uses, and for insulators in X-ray and in radio equipment. What are probably the largest moldings ever made from any plastic are produced in shellac. One such molding, produced by the Insulation Manufacturing Company, weighs, with metal inserts, about 80 pounds, and has been made in considerable quantities.

THAT PRICELESS

SOMETHING

. . . in every molded part is the experience of its molder.

Consider the value of our thirty-eight years successful molding experience as applied to the efficient handling of your own requirements—plastic or hard rubber.

J. Stokes Rubber Co.

TRENTON, N. J.

Canadian Plant, Welland, Ont.

Shellac is a thermoplastic material and in some forms begins to soften at temperatures as low as 105 deg. F. This low softening point is a decided disadvantage in some applications, but when this is the case it is possible to make a shellac compound for use at temperatures of at least 160 deg. F., and recent research points to the development of shellac mixtures which are not soft at temperatures even up to 240 deg. F., which is a higher temperature than most common thermoplastic materials will withstand, though it is lower than the thermosetting phenolic moldings withstand.

Shellac mixtures used in molding usually contain at least sixty per cent of fillers, mica being extensively used. Black or the natural brown colors are most used. Moldings are not so strong as those made from most other plastics and are much more brittle than some, but the electrical insulating properties are excellent, especially under certain conditions where moisture is present and in which some other materials are subject to failure. Shellac has been molded by the injection method for many years and this method is still followed in making some pieces, but not with the modern types of high-speed injection molding machines, so far as the writer is aware. If molds are polished, the molded piece also has a lustrous surface.

Hard rubber, once a most important plastic, has now been largely replaced by phenolic plastics which, in general, are less expensively and more rapidly produced and have a better finish and one not affected by exposure to sunlight. Soft rubber, for which there is no less expensive substitute having equal properties, need not be discussed here. There is, however, another form of plastic made from a rubber base and without vulcanizing, which is comparable in many respects to other thermoplastics and which is molded in the same way. It is known as plioform and is a true thermoplastic material. In appearance it is more like pyroxylin and cellulose actetate than rubber and would not be recognized as rubber without chemical tests. Like most thermoplastics, it does not change chemically when molded but can be softened again by heat and remolded. Once softened, it is readily molded under pressure and can be removed from the mold as soon as the latter is cooled so that the piece will retain its shape, as with other thermoplastics.

Plioform is available in transparent, translucent and opaque forms and in a variety of colors. It is odorless and tasteless and quite resistant to chemical action. Physical properties are similar to those of other plastics, so far as strength is concerned, but resistance to water is excellent and dielectric (insulating) properties are also good. The material is quite tough and resistant to breakage, in which respects it resembles cellulose acetate and pyroxylin plastics. The effects of aging and light exposure are said to be slight. Softening occurs at about 140 deg. F. and molding is done at 260 to 300 deg. F. in the same molds which are used for other plastics.

Clear and translucent moldings, some of which are produced from Trolitul, a German poly-styrol plastic. (Photograph courtesy of Eckert & Ziegler, Germany.)

PLASTICIZERS, SOLVENTS and RAW MATERIALS

For the Manufacture of

PLASTICS, LACQUERS—and COATINGS

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Injection-molded items, some of which are made from a poly-styrol plastic called Trolitul produced in Germany. The styrols have the lowest electrical losses of any plastic yet produced and for this reason are employed especially in high-frequency applications. These products are made on the Eckert & Ziegler injection-molding machine and the photographs are furnished by courtesy of that firm

This material can be so compounded as to produce beautiful mottled and opalescent effects. The material is not resistant to the effects of oil and grease, as some, other plastics are, but can be made so by a simple treatment. Although Plioform will burn, it is not highly inflammable. It has not yet seen extensive commercial use, but is believed to be suited for use in a wide range of molded articles. A special form has been developed for use as a wrapping tissue.

Another form of plastic, in which formaldehyde figures, is casein. The casein itself is a milk product, but when suitably prepared and treated with formaldehyde it forms a hard and enduring plastic which has seen wide application and still finds extensive use. In this country the chief use of casein plastics is in the manufacture of buttons and buckles. These are made either from sheet or from rods of casein plastic which is worked by machining operations. In Europe, the same material is employed as handles for cutlery, umbrellas and other products, but in this country such handles are now usually made from phenolic plastics or from pyroxylin. Casein makes an excellent material for buttons, being hard, smooth and not easily broken. It can also be colored readily so as to match various fabrics and such machining as is needed is readily done. Competition in the button field is keen, however, and cast phenolics as well as buttons molded from phenolic, urea and cellulose plastics are tending to limit the application of casein.

Styrol plastics have gained considerable use in Europe, but, partly because they are rather expensive when produced in small quantities, they have not found wide application in this country. Victron, which the chemist calls "meta styrene" is an American product of the styrol type. It is a water-white solid in its natural form but can be colored if desired. According to its makers "it is not inflammable but will burn if properly ignited. It burns less readily than hard rubber."

Victron softens readily and is a true thermoplastic material. The softening point is given as 200 deg. F. Heating above 230 deg. F. causes shrinkage. Molding is preferably done at temperatures of 293 to 320 deg. F. and at a pressure of 300 to 1000 lb. per sq. in. The material is highly resistant to most chemical reagents and is not attacked by moderately strong acids, alkalies, alcohols or mineral or vegetable oils. It is probably the most resistant to water of any plastic and is considered "absolutely water proof." It shows zero absorption of water in 24-hour immersion tests at room temperatures.

Styrol plastics are probably the best dielectrics known, being superior even to natural amber and quartz. Victron has an extraordinary property of withstanding high-frequency voltages and is not affected by high-frequency fields which (*Continued on page 64*)

The Lyseth Thread Company are winding cotton thread on phenolic molded spools which are absolutely uniform, mechanically strong and accurate to 0.005 in. A number of advantages are claimed for this spool. It makes it possible for the winding mechanism to function properly, thereby winding a perfect tube of thread. It permits the operator to use the last inch of thread, eliminating waste. It prevents the thread from catching. The construction makes it impossible for the operator to place the spool wrong side up, assuring the unwinding of the thread in the right direction. Photo, Courtesy of Bakelite Corporation

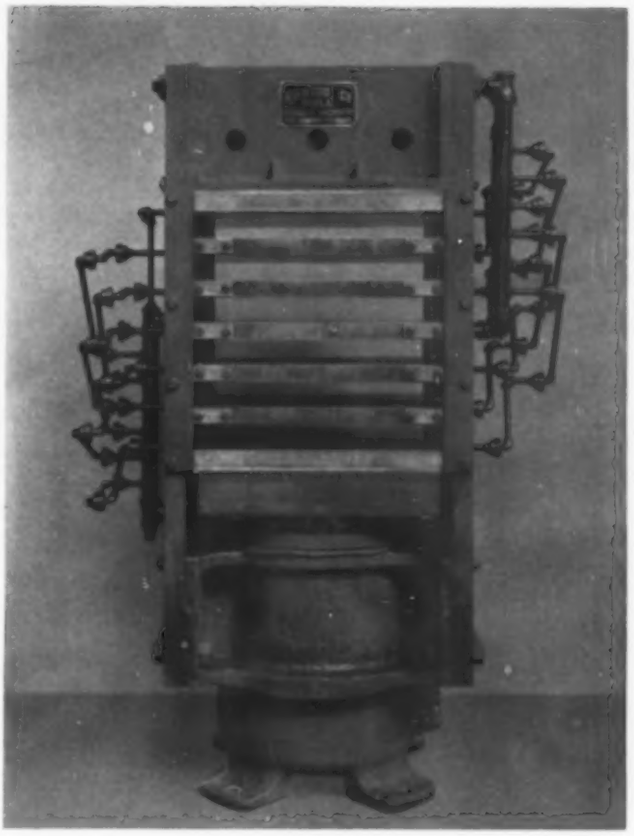
THE SAMPLING PRINCIPLE

(*Continued from page 28*) and instruction sheets on color harmony, which are necessary for the inexperienced and the indiscriminating user of polish, but which get rumpled, torn, or even lost in the rush of a busy department store day. The printed sticker referred to is entitled, "The Right Shade of Polish to Wear with Your Gown." Each shade is described in turn. Its suitability to day or evening wear, to use when the wearer is costumed in bright or dull colors, and to use by persons of dark or fair complexions is made clear in each of the eight paragraphs.

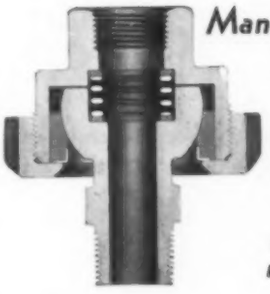
And economy—in that the sampler at the counter keeps the customer there, where she can purchase immediately the kind of polish made by the promoters of the sampler. It tends to eliminate the loss of sale which results when a customer takes a sample home, comes downtown another day, to another store, to get the shade she desires, possibly forgets its trade name or finds the store does not carry the brand she has requested, and accepts a competitor's product which is "just as good" as the one she sampled.

DESIGN FOR BLACK

(*Continued from page 17*) backs ending in a square knob which catch three highlights instead of one. Wiped-in engraving contributes to its richness. G sparkles from any angle because of the bands of concentric grooves alternated with flat ungrooved bands—an inexpensive die-cutting operation. H is sculptured in



6 REASONS WHY



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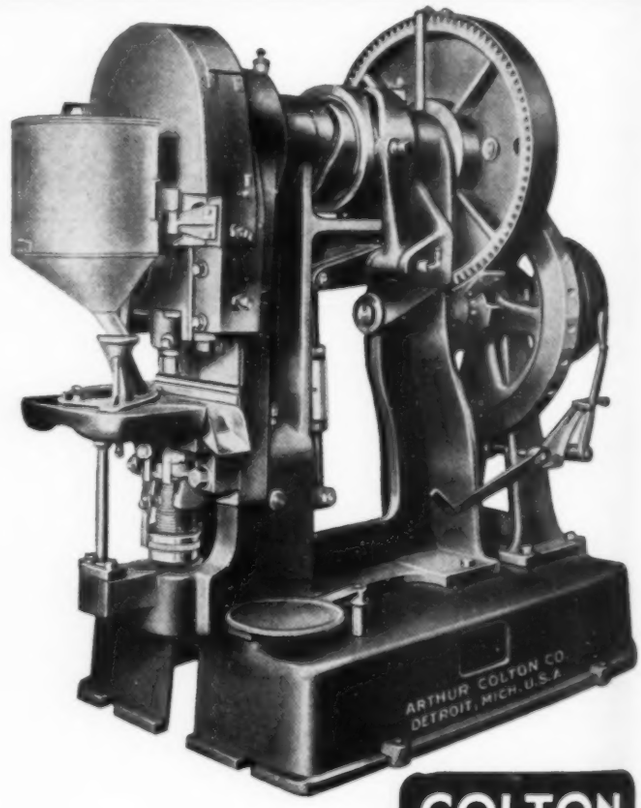

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COLTON DETROIT

a radial flower petal motif, with softly rounded surfaces. I is distinguished by three set-backs which catch lights on the edges. J and K are interesting and appealing largely because of their rounded top surface, which always looks more lustrous than a flat surface, and because of the wiped-in engraving.

Speaking of wiped-in engraving, this can often be overdone or done poorly. It adds both to the mold cost and the per-piece cost, and while sometimes necessary it probably rates below the other forms of decorative technique. It has much greater visibility for identification or trade marking than reliefed lettering, but for decorative uses it should be laid out by an artist wherever possible to assure good taste. Most manufacturers will find their advertising agencies equipped and eager to help on decorative problems of this sort, and often it is possible to take a model of a plain molded part to a practicing industrial artist and get suggestions on decorative technique and smoothing of contours for less outlay than if he were to re-design the complete product, furnish blue prints, etc.

Metal Contrasts. The third illustration shows how the use of bright metal parts or inlays in conjunction with black phenolic moldings can increase their richness and appeal. Theoretically, if a piece were well-designed, it should not need any applied metal decoration, but often objects from existing molds can be snapped up at little extra cost by using inlays or applied metal accents. When metal parts are used structurally as in the pen-funnel and the handle not even a purist can justly criticize it.

Right now, there seems to be a vogue for black moldings with gold-plated accents or structural parts. It has far more warmth than chromium and lends just as much contrast. Its appeal is undeniable, proved by the recent instance of a small gold-and-black-phenolic clock case which outsold pastel-colored cases by a wide margin. The pen-stand set shown above was also more successful in black than in colors. Black phenolic seems to be the perfect background for bright metal decorations.

Walter Teague has designed some very distinguished things in black phenolic plastics. Most of us are familiar with his Stormoguide case in dull-rubbed finish with chromium flutes at the side, and his thermometers with parallel ribs catching subdued sparkles at top and bottom of the scale, but one of his more recent designs is probably his best effort. It's a small, flat, rounded-end instrument case and is ingeniously striped with parallel ribs running lengthwise completely around the case. A shiny, raised $^{1}/_{16}$" rib is placed between a $^{3}/_{16}$" flat band of fine ribs and a $^{3}/_{16}$" flat smooth band. The fine ribs diffuse the light and create gray, the flat band is black and the raised shiny rib looks white—producing the illusion of stripes in a rich gray to black to white contrast. The piece combines a surprising sparkle with dignity and a feeling of real value.

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From the above, one might think that unless a black piece is decorated it is uninteresting. This is certainly not true for some of the most attractive of black moldings are completely unadorned. It is almost an infallible rule, though, that unless a black piece has quite a bit of curved surface it will lack interest, because the highlights on the curved surfaces relieve the blackness. Notable examples of attractive but undecorated black moldings are a cream jar by deVaulchier with nothing but curved surfaces, and a molded viscosity meter whose function rather than aesthetic regard dictated a series of curved surfaces on all three dimensions.

Can amateur designers apply these rules for designing in black?—you may ask. I believe so; at least enough to improve the appearance of much of the run-of-mine molding now being done in black. Nearly every layman knows when a black molding lacks something, and the lack is almost always a question of contrast. If he strives to keep his decoration simple, avoiding conflicts between the directions of his decorative elements, and remembers not to sprawl it over the entire piece unless it is a simple directional stripe design—he can't go far wrong. For more important work in which good taste and appeal are major objectives, there is no substitute for the experienced industrial artist, and whether he is used for the complete ground-up design job or merely for suggestions on decorative treatment after the function determines the shape, the investment will be well worth while.

PLASTICS . . . THE FUTURE AND THE CHEMIST

(*Continued from page 25*) ness. Semi-solid properties can be obtained at will by fillers. All these characteristics would seem to qualify them as basic materials for an ideal plastic and particularly so in the fields which are not accessible to the inorganic materials. After all, it is not only a question of producing an ideal material, but also one which opens new fields and can command a price commensurate with production cost. In this connection, it is best to keep clearly in mind that owing to their complex origin, often higher handling costs and definitely more restricted field (while more diversified), organic plastics have a prospect of competing successfully with the inorganic ones only in a comparatively limited number of instances.

Furthermore, it must be said that organic materials as a rule are decidedly inferior to the inorganic ones in chemical resistance, although there are specific exceptions to this. Such is the use of asbestos filled phenoplastic for acid containers. These exceptions merely help to clarify the rule.

With the restrictions in regard to price and resistance of the material in mind, it may be said that the scope of the modern plastics industry is the manufacture of articles which previously required the combination of various materials, particularly where exact duplication is important. Tooling expenses are almost entirely

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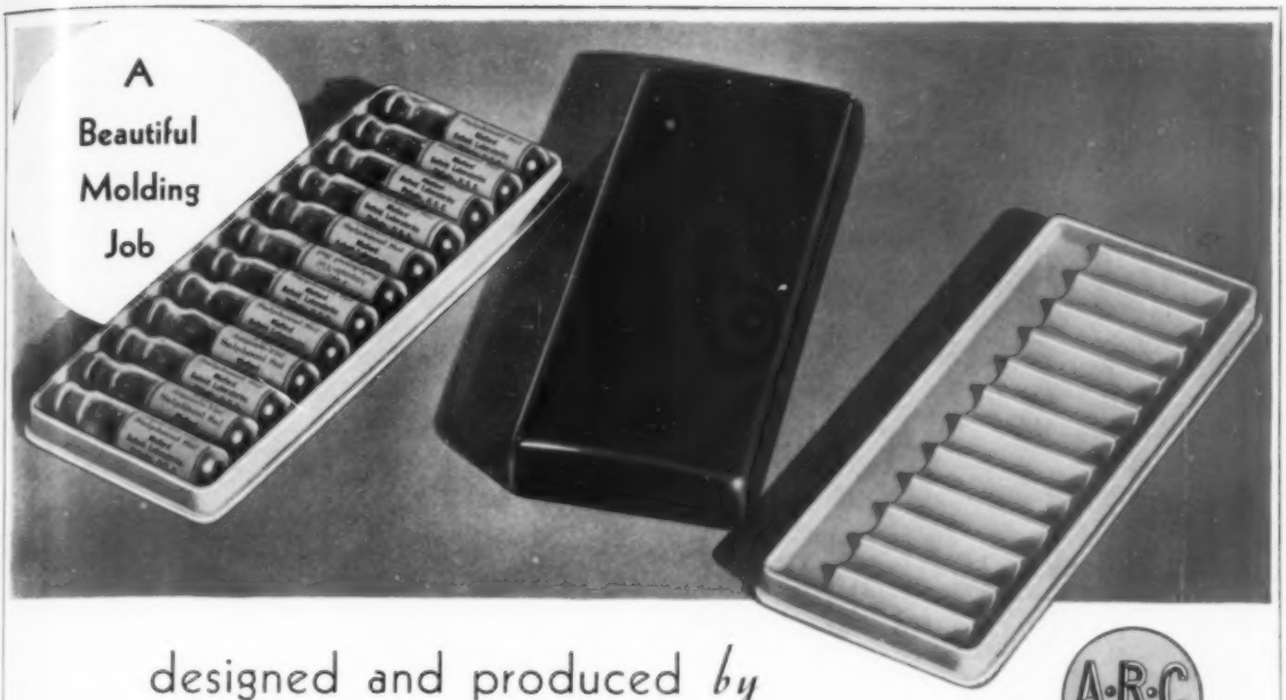

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limited to the mold and are, therefore, greatly reduced per piece molded if a sufficient number of these is produced from the same mold.

There are, of course, exceptions to this statement of scope which, however, do not nullify the rule. They are based on the use or exploitation of certain specific properties of the organic plastic materials. Among these exceptions is mainly the continuous manufacture of film, whose utility is based entirely on toughness and flexibility, combined with glass-like transparency.

The role of the chemist and chemical engineer in the plastic industry is seen to be essentially the continuance of the early work which led to the development of hard rubber toward the middle of the last century and the cellulose esters about twenty years later. These materials not only had definite advantages over natural products, such as shellac, but could also be procured in practically unlimited amounts and at a relatively low cost.

The finished molded shape with these plastics was, however, somewhat temporary inasmuch as mere heating would allow it to be changed. While this has an advantage in view of the possibility to mend or alter the finished article readily (dentures), it must be regarded as a weakness for applications where a definite shape is desired. In spite of casein, it was not until after the turn of the century that a basically new material was offered. This new material revolutionized the ideas about plastics, in that it was the first non-refusible organic material.

The development of Bakelite is illuminating in retrospect and helps to visualize the importance of properly conducted research. The remarks made here are intended as illustrations of possibilities rather than a criticism. Neither Dr. Baekeland nor Dr. Redman had in mind (in the early stages of their work) the wide application to which this important material was to be put. They had discovered a material which was amber and fairly indestructible. It was not moldable in the sense which this term has taken on today. It was a synthetic amber. One of the first large-scale outlets for it was a solution in an incompletely reacted form for furniture lacquer.

Molding of phenoplastics was developed subsequently and is to the present time successful only with filled compositions and in relatively dark colors. Even so this material has revolutionized the industry. So imbued have many become with its excellence that its dormant possibilities are apparently left undeveloped and there may be a rude awakening in store for some.

Let us review the physical and chemical properties of phenoplastic. Here is a material with excellent chemical resistance, particularly to acids. It is brittle, but can readily be plasticized as cast phenolics have recently demonstrated. On molding it tends to froth, but there is evidence that this too is subject to control. In the early exploitation it was found that both of these faults could be corrected by admixture of woodflour. When the raw material costs were excessively high this dilution with low-priced filler was of utmost importance. But let us

examine the filled product. Its resistance to weathering has fallen off badly. While it is eminently suitable for a thousand uses, particularly indoors, in every business where its electrical insulating properties are important, there is a corps of men worrying over the pernicious effects of moisture upon it. There is a distinct call for some one to continue the work of the inventors and (in less inventive work but more guided by past experience) to fully develop the possibilities of this material. This may be done, for instance, by more thoroughly combining the resin with the filler. It will then, no doubt, have the undesirable effect that the compound will again become brittle. But ways to overcome this are already known.

There is as yet no unfilled phenolic molding compound on the market. Here lies another challenge to the chemist, if given the opportunity. What is more: some one will do it.

There should be no need to further emphasize the fact that development work for all products in the plastics field is basically of a chemical nature. There is ample proof of this in the number of chemists and chemical engineers who have become leaders in this industry through their chemical achievements. A warning may be in order, however, to those who seem to believe that once a product is developed, there is nothing left to do, but to keep making and selling it; that the chemist has henceforth a value only as control chemist. This statement is in no way derogatory to the excellent and sorely needed efforts which are being put forward by merchandising experts and industrial designers in expanding the use of plastics through education of the consumer and through assistance in artful designing of the products. These very efforts in turn lead the consumer to expect even more of these new materials and it is obviously a wiser policy to satisfy all reasonable demands on the material in an increasing measure, rather than to tone down the public's expectations.

The opinion is sometimes heard that in the interest of economy chemists should be employed only when there are very definite and particularly urgent problems to be solved, with the idea that chemists can be hired again when needed and are more easily found than, for instance, good mechanics. Those holding such an opinion (one may wonder how they dare to admit it) at once identify themselves as not understanding the proper function of either chemist or chemical engineer in the industry. This is particularly indicated by the use of the qualifying adjective good with the mechanic, while it is generally omitted with the chemist. In the minds of this group a chemist is at best a wizard. He may be anything from an assistant who has had six weeks' training for running metal or sugar assays, to a highly qualified and specialized executive.

It is, of course, evident that a good mechanic is just as hard to find as a good chemist because any one proficient in his craft or profession is a bargain at any reasonable salary to the one who knows how to make adequate

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use of his services. There is, nevertheless, the difference that, because of the greater complexity which is prevalent in the chemical field, it is more difficult here to find a suitable fit between job and incumbent. Not every chemist, no matter how well trained or how likable, fits every chemical job. One of the greatest organizers in history, Napoleon Bonaparte, is said to have expressed his experience with the management of armies thus: there are no bad armies, only poor generals. He may have exaggerated but very likely was essentially correct.

From the standpoint of management no apologies should have to be made for the fact that the whole plastics industry is so young and in many respects original, that there is little precedent to fall back on. This may be seen clearly by comparing, for instance, with the automobile or sugar industry, where no fundamental changes have been made since the time when heat-hardening plastics first became known. Those whose nature is not to be very progressive may find it difficult to orient themselves in such a young industry. It must be realized once and for all that there are definite limitations for all structural materials and without scientific planning progress will be costly and slow. It would at once appear inappropriate to construct a house entirely of brick, entirely of steel or of glass. A more minute analysis of requirements and of the inherent properties of materials is necessary in the plastics field, than among the older and better known building materials. These conditions limit profits and are at times troublesome. They are, however, a real incentive to constructive work and—must it be admitted?—also provide the chemists means of livelihood.

During the present period of restricted business the introduction of entirely new materials may not be advisable generally, even though it has been done with signal success. Where success was had it was mostly due to constant and diligent analysis of market requirements and of the inherent properties of available materials. To illustrate: it is probably useless to work with urea resin, glyptals, or cellulose esters, when extreme resistance to moisture is required, unless a very substantial admixture of other compatible materials is considered.

With the general improvement in business new capital will be seeking the plastics field and it is to be hoped that the field will be found properly prepared through exploratory research. Failure of this would be likely to lead to experiences which would not benefit either the individual investor or the plastics industry as a whole.

Recent history of the plastics industry has furnished several examples both in success and failure, which substantiate the views presented in this critical survey. There is, on the one hand a manufacturer who has not heretofore been in the shatter-proof glass business coming out with a new resinous binder or buffer sheet of amazing flexibility which, furthermore, bonds so thoroughly to the glass that it does not require a seal along the edge. On the other hand, one development for a

new molding compound has had to be dropped after much expense was incurred, because of inherent shortcomings which an expert in the molding field must have realized very soon after work was begun. The application was somewhat outside of the company's own line of business.

Considerable work remains to be done by the financially able concerns to provide a solid foundation for business expansion and to supply the data needed by their sales forces. There is probably no simple formula for determining the best relationship of research to sales expense. A great deal of research work can be done at relatively low expense. Nevertheless, the assertion is here made that there is nothing incalculable or extremely expensive about research and development work if these are competently directed. This can be demonstrated by the experience of other industries.

If past experience can be taken for a guide, diligent efforts along these lines will be amply rewarded. Dependance on luck to turn up new products is going out of date by the gradual disappearance of those who try this method. Conscious and continuous survey of the market must take its place, combined with competent analysis of available materials and of the possibilities of new raw materials. Last but not least, this attitude alone will supply the necessary fund of information which can find a way through the prevailing unfortunate maze of patent claims in this field and keep the piling up of worthless claims from throttling the business.

Increased and more reliable physical and chemical data on the various plastics would lead to more uniform listings and a better understanding by the molders of the materials which they are using. Then Plastics could be applied more appropriately and many failures could be eliminated to everyone's advantage. To have several different manufacturers match a certain color only to have most of their materials eliminated later on grounds of resiliency, color brilliance or moldability, is very wasteful, both in cost and prestige to the industry as a whole.

Backing by accurate data generates a spirit of fair play among competitors largely because of the greater dependability which it provides. There is a market for many different materials providing that they all show a favorable balance of their cost in comparison to their advantages and that they differ sufficiently from each other to expand the market rather than encroach upon each other's field.

It is unlikely that a state of perfection will ever be reached in which a complete tabulation of all characteristics of all materials would enable anyone without knowledge of the art to select suitable plastics for any application. Even the simple fact that not all plastics can be molded advantageously in the same mold, if nothing else, would prevent the advent of so heavenly a state of affairs. Much could be done, however, which would add to the stability and sound progress of the entire plastics industry.

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WHICH PLASTICS TO CHOOSE?

(*Continued from page 54*) cause ordinary plastics to melt or take fire. In other words, its electrical losses are far below those of other plastics. For this reason, it is employed chiefly in high-frequency service, especially in radio applications where low electrical losses are important. The power factor is given as less than 0.03 per cent at 900 kilocycles. Dielectric strength is given 517 volts per mil on pieces $^1/_8$ in. thick and 1200 volts per mil on pieces 10 mils thick. Physical strength is equal to or better than most plastics. Machining is readily done.

Victron is said to be well adapted to injection molding and it is known that styrol plastics produced in Germany have been so used to advantage. Some parts which it would be difficult or impossible to produce in any other way have been made in this way. If the future demand for styrol plastics is sufficient to encourage their production in quantities and to lower their price materially, they may become an important factor in the plastics field. In some instances these materials have been quite subject to "cold flow," that is, a tendency to change shape permanently even at normal temperatures when subject to stress. In some applications this is a serious disadvantage and in others it is of small consequence. There may be a means of overcoming it, in which event the field of use will be enlarged.

Benzyl cellulose is another plastic similar in certain respects to cellulose acetate but differing in chemical composition. It is relatively noninflammable and is low in its tendency to absorb water from the atmosphere besides being a good insulator. It is quite resistant to mild acids and alkalies and is capable of producing molded parts with considerable accuracy, as variations in heating and cooling do not greatly affect the size of the molded piece. This material is said to be especially well suited for use in injection molding and appears to have been so employed in Europe. It is also moldable in ordinary presses at a temperature of about 212 to 248 deg. F. So far as the writer knows, however, this material has not seen extensive use in this country.

Its tensile strength and shock resistance are reported comparable to acetate plastics, but moldability is said to be better, the softening point lower. Moldings may show some tendency to embrittlement on aging.

Another cellulose plastic which the chemist classifies as a cellulose ether (in which class benzyl cellulose also belongs) is ethyl cellulose. This material is somewhat stronger than benzyl cellulose, has reduced water resistance but excellent light resistance and maintains its toughness even at extremely low temperatures. Both ethyl and benzyl cellulose plastics handle well in injection molding and can be extruded and formed into sheets, rods or tubes. Thus far, a rather high price has militated against the extensive use of these plastics, but some capable judges are of the opinion that they are likely to become available at a price which will encourage much wider use.

Cellulose xanthate, still another cellulose product and one which is said to be rather inexpensive, has been

used abroad for the manufacture of phonograph records and bottle caps, among other plastic products. If used at all in this country, it has not gained much prominence and hence need not be given special attention.

Cresol resins, which are very similar to the phenolic type in many properties and less expensive to produce, have gained wide use in the plastic field, but are used very little if any in making molding plastics. This is partly because they cure more slowly than the phenolic type. Their chief use is in resins for impregnating paper and fabric which is to be laminated into gears and for other purposes in which laminated products are employed. As cresol resins are made by some producers of phenolic resins, they are often classed with the latter, although they differ chemically. In laminating work, the slower curing is not an important factor and as superior products are secured, at least for certain classes of laminated work, in the opinion of some specialists, the cresol resins have seen much use by some laminators.

Resins which the chemist classes as phthalic anhydride rank second in quantity produced to the phenolic forms, but their use as plastics or in plastic compounds is quite limited, partly because they are very slow in curing. A very large proportion of the total output is employed in making finishes of the varnish and enamel type. The General Electric Company makes this class of resins under the name Glyptal and the Bakelite Corporation has used them to some extent in making certain cast forms of resinoid in which long curing is common. Some very beautiful products are produced from this material but as yet it has not found very wide application as compared to other cast resins.

In the doll-making industry, a plastic material consisting largely of common rosin and cornstarch as a binder for wood flour is used in considerable quantities. Although it answers for this purpose, it is lacking in strength and many other qualities found in the other plastics, hence its application is limited to very cheap and rather inferior products and it is not used in shops where custom molding is done.

This completes the list of plastics with which the molding industry is generally concerned, although there are, of course, many other plastics which have been produced in commercial quantities. Many new plastics are constantly being discovered, as the records of the Patent Office show, and some that seem very promising are undergoing development. Just what the future may bring forth nobody can predict.

Although many new forms of resin which are better in some respects than existing types are likely to be developed, and some of these may displace certain types now in use, such a change is not likely to come about suddenly, if past experience can be taken as a criterion. In fact, nearly every type of plastic that ever gained extensive use is still employed to some extent even though new products which are superior in certain respects have come on the market. Should future developments bring into being a new plastic which is less expensive than the commoner types now in use and which can be had in any color and degree of translu-

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cency, there is no doubt that it would have a far-reaching effect in the plastic field, providing its strength and other properties are not greatly inferior to those of existing types. Such a product does not seem to be in sight today, but its advent is a thing to which the energies of many research workers are being directed. When and if it arrives the plastics industry seems destined for an even more rapid advance than it has known in its kaleidoscopic past.

FROM OLD TO NEW WITH LURELLE GUILD

(*Continued from page 15*) substitutes a new material for another that has been used previously, when he adds new usefulness to the object he is redesigning, he is not guessing at the utilitarian result, he knows. He is reasonably sure, too, before any redesigned object leaves his hands, it will pretty well measure up to the needs and desires of the consuming public whom it is designed to please. When he uses plastics for any purpose, he takes utmost advantage of their intrinsic value as examples will show.

In the recent exhibition of Arts in Industry at Radio City, two drip coffee pots and a unique teakettle—designed by Mr. Guild for the Aluminum Cooking Utensil Company—gained outstanding attention and comment. While viewing them I became interested in a chance remark I overheard—"that he never has designed a commercial failure." That remark deserved checking and it develops that Mr. Guild's designs are well tested for any possible errors in judgment before they ever are offered for sale.

Take the two percolators—back in 1931 the Aluminum Company was considering a redesign program but the incidental costs of new dies and tools were formidable to say nothing about the costs of designing service and losses through stock on hand and other items. It was finally decided, however, to experiment with redesign and Mr. Guild was called in.

The first product in the redesign campaign, which since has developed to rather ambitious proportions, was the drip coffee pot which was revised along Early American lines using lustrous aluminum with contrasting black handles of plastic material. This was first offered to the public early in 1932 as sort of feeler to indicate whether good taste in design would prove an incentive to buy. The result is history. During the first six months, the Aluminum Company happily watched the sales of the redesigned coffee pot increase more than 90% over the normal average annual sale of similar coffee pots.

Shortly after, Mr. Guild redesigned a pitcher and the now famous teakettle with non-flexing plastic handle for easy pouring. This teakettle proves the soundness of Mr. Guild's research methods and its prompt acceptance and acclaim by the public offers convincing proof of public appreciation of improved design. Teakettles, from the beginning, have been fashioned in many

shapes of many materials. The lone tradition handed down through the years it seems was a handle of some sort hinged fore and aft which dropped down onto the side of the kettle when not in use. In this position, it was sure to get too hot to handle and besides this it was discovered after all these years that in order to pour water from the kettle it was necessary to crook your arm in an awkward position. Mr. Guild remembered an ancient watering pot in his collection whose handle was rigid and so placed that water flowed freely while in a comfortable position to hold. This principle was applied to the new WEAREVER teakettle. The non-flexing trench-knife handle of plastic material gives a safe and comfortable grip which is never too hot to hold.

It looked like a good idea but there were disadvantages in packing and shipping. A larger carton would be required for individual kettles and a lesser number could be packed in a case. It was decided to take the problem direct to housewives for decision. Several models were made and salesmen canvassed the residential sections of New Kensington and Pittsburgh in Pennsylvania with samples of the old style kettles and the new. Housewives were approached with the simple question: "Which of these teakettles would you choose if you were buying one?" Forty-six out of every fifty answers favored the new design.

This was encouraging but not sufficiently convincing to swing into production, so arrangement was made with a New York Department Store to arrange a display in the kitchen utensil department where a girl was placed at a table on which the two kettles were displayed. The first 236 women who approached the table were asked without any further explanation which of the two kettles, selling at the same price, they would prefer. Two hundred thirty-two expressed preference for the new design.

From this point on the new teakettle was a success. It was the first ever offered with a non-slip grip—and the first with a stationary bale. The plastic is molded directly to the hard alloy aluminum bale which is spot welded to the kettle eliminating both rivets and crevices which are hard to clean. The bee-hive shape combines maximum heating surface with pleasing design.

During the first few months, sales were 120% greater than averages on similar utensils. Carrying comparisons still further we learn that sales over a period of two years after the new design was introduced were 140% better than on the standard teakettle during the two years preceding the new design.

When Mr. Guild redesigned the Norge Refrigerator, he used plastics in two important points where he claims no other material could possibly function as well. Norge refrigerators are built for years of service. It is important that the seal, which keeps cold air in and warm air out of the refrigerator when the door is closed, be made of permanent non-changing material. Because of its homogeneous construction and lasting finish, plastic material is used for this important job, and is clearly visible in the accompanying illustration. Control knobs and door handles are also of plastics for similar

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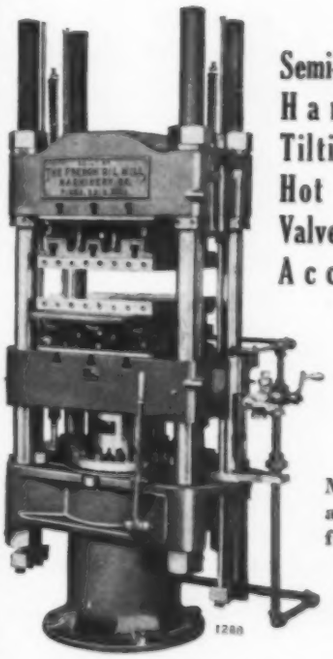

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reasons and because they furnish a decorative note in keeping with the high quality of the product as a whole.

Teakettles or Pullman Cars are all in a day's work for Mr. Guild. The streamlined Pullman observation coach exhibited at the Century of Progress exhibition at Chicago by the Aluminum Company of America was of his design. The sills were of plastic because their permanent finish can be more easily cleaned and never wear through. The table tops were of the same material so refreshments and cigarettes could do them no harm.

Among his more recent designs is the New Kensington line of all metal Giftwares, which is another delightful "best seller" despite the fact it offered no opportunity for the use of plastics.

PRACTICAL PLASTICS SCORE OVER TRADITIONAL WOOD

(*Continued from page 37*) All of us dislike to use a product which is an imitation. However, we must be practical and the fact that, of the two hundred thousand Model P radios sold by International that season, over 75% were of a mottled effect in imitation of walnut woods made it not such a bad color scheme after all. The remaining 25% of sales were in colors that fitted into the decorative scheme of any interior. There were ivory, green, orchid, blue and pink for the bedroom: black and marble for the sun parlor or study, as well as a brilliant red shade for the office or child's room.

So much did the use of plastics revive the activity of the industry that countless radio manufacturers made their appearance with copies of the original molded radio the following season. A new type of beauty in radio had been established, thanks to plastics.

Since the first attempt in 1932, each year has found International producing a new molded cabinet. Each subsequent model has been an improvement over the preceding one, due to the discovery of the new uses afforded by varying the different plastics in the same composition. The second radio brought out by International in 1933 employed the use of two oval plaques molded separately from the cabinet and containing a chromium head of a Cadet, in keeping with the new trade name Kadette. These were applied as inserts and were in all cases of a different, but harmonizing, color than the balance of the case.

Later in 1933 a two-tube radio was introduced, so small that it was termed a pocket set. True to its name, one could easily carry it in the pocket. However, this feature was made possible only because the molding allowed for the complete absence of sharp corners that would have otherwise hindered the ease with which it dropped into the pocket.

Following the pocket model is the present Kadette Jewel which is termed by many the most attractive of all. This opinion is brought about not particularly because of its design but due mostly to the way in which the separate grille idea has added to its interest. By having the grilles molded separately, it has been

possible to make them of a cellulose acetate from which the effects of precious stones have been duplicated. These grilles we have produced in representation of jade, coral, onyx, moonstone and other jewels, which when properly installed into a cabinet of a pleasing contrasting shade, produce a most effective composition. They are pressed into a recess provided in the cabinet which holds them in place without the need of any adhesive substance. The Jewel has seemingly met with a great deal of popularity and has been an excellent seller with our jobbers and dealers.

I have been asked to write about what I know of designing radios in plastics. The more experience I have with it, the less I find I know. Each time I make a new design, I wonder why this or that new discovery had not come to me before. I know nothing about plastics so great are its possibilities. However, I do know that each and every time I have thought to supplant its use by wood, experience has immediately forced me to come back to plastics. For this reason, I am anxiously awaiting each new design request, knowing that I am working in a material that meets with public approval.

PLASTICS STAKE IN SIMPLIFICATION—STANDARDIZATION

(*Continued from page 48*) industrial designing, the doctors at Washington insist that there is a gain for the cause of creative design in the fixing of boundaries for the play of genius. Under a free-for-all state of designing and manufacture, the striving for competitive advantage led to recourse to "oversize" and "undersize" dimensions and to the taking of all manner of liberties which affected the outcome of the race for popular favor when ill-assorted entries, even unto freaks, ranged side by side on store shelves. Hence the logic that, given inflexible formula for certain common physical characteristics of articles of manufacture, there will be all the more incentive to strive for innovations in ornamentation and in accessories—and always a sharper challenge to the miracle worker in color.

The Standardization which is a major influence upon plastics progress is that which deals with "trade standards"—presumably standards of grades, quality or measurement. This standardization is not applicable solely on the selling side. Trade standardization has become a vital factor in scientific purchasing and among the keenest consultants of the accepted trade standards are the expert industrial purchasing agents.

In order to encourage Standardization the Federal Government will lend its facilities as an unbiased central agency when so much as 65 per cent of an industry (by volume of annual production) is willing to subscribe in writing to a set of standards. This low majority requirement is in contrast to the rule of 80 per cent compliance which is enforced in every project in voluntary Simplification. A certification plan is applied on request in witness to the workings of Standardization. And provision is made for regular revision of trade standards through the appointment of

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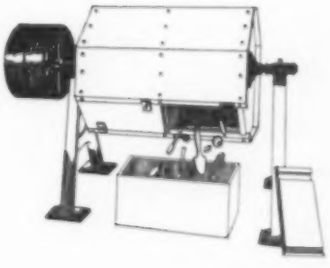

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a standing committee in each industry to consider periodically any necessity for revision of the standards to keep in step with the forward march of the industry.

Even this lay-out does not represent the full span of the trade standardization program. As part of the co-operation into which the Government has entered there is team-play with the American Standards Association and with the American Society for Testing Materials. The value of these alliances has been vividly illustrated within the past few years when, due to the tightening of purse strings in certain quarters at Washington, valuable work at the National Bureau of Standards would have been discontinued or drastically curtailed had not the American Standards Association come to the rescue.

At best, the evolution and acceptance of trade standards is apt to be rather a slow process, even after an industry has been fairly well sold on the basic proposition. Preliminary conferences are followed by general conferences. And, since the Consumers Advisory Board has been on the job at Washington that agency has frequently put in its oar to insure the adoption of quality standards that safeguard the consumer's interest. Happily, in all the current activity in behalf of standardization, there is little risk of duplication of effort, thanks to an arrangement between the National Bureau of Standards and the American Standards Association whereby both agencies follow the same procedure, each organization devoting itself to the projects assigned to it.

Coming back to Simplification, the NRA Codes have boosted the cause of simplified practice. In some instances, Simplification recommendations were put into the Codes and in numerous other instances sympathy was expressed for the idea. Meanwhile offshoots of the main idea were sprouting in different directions. For example, the crusade for Simplification of catalogs and trade literature. Finally—with a leading string running straight to plastics—the movement for Simplification of containers. Not merely primary containers, but secondary containers, as well.

This container venture, being so close to the plastics sector, is an appropriate object lesson in the workings of Simplification. To begin with, this project plumes itself on the fact that it is concerned with the cause of better *distribution* of merchandise. For upward of two score years the ambitions of American engineering and inventive genius have been directed principally to the problems of production. Now the strategy of marketing or distribution has its turn, and escape from a chaos of containers is part of the plot. Simplification of containers—where it may be undertaken without hazard to sales-appeal—is being urged on the plea that, on top of the saving in the first cost of the containers, there will come savings in the cost of handling, loading, unloading and storage. With packagers jealous of the individuality of their consumer-units, it is all too evident that Simplification, if it ventures beyond restriction of dimensions or capacities of containers to the unfettered field of container materials and designs,

is treading upon dangerous ground. Jolly well do the Simplificationists know this and so they are discreetly prescribing their medicine only for packages where individuality is largely confined to labels and closures rather than to shapes, textures, finishes and tints of the receptacles.

Whatever may be personal opinion as to the advantage or disadvantage of Simplification to an adventurous, explorative industry, such as the plastics assemblage, there is one aspect of ritualism which must be reckoned with. This inevitable is the Standardization of Specifications. Here again it is a case of partnership between Uncle Sam and industry. With perhaps a little extra self-interest in the Governmental participation, seeing as how Uncle Sam is himself one of the largest consumers of the products of industry.

With standardization of specifications, as with the other schemes for mutual self-discipline, it is a case of the Government providing the clearing house. The Division of Specifications, which directs but does not wholly boss the job of unification, cooperates with technical societies, trade associations, testing and research laboratories, and the various public and private agencies which make or use specifications. It is working on an Encyclopedia of Specifications—with one volume allotted to each major industry—and is issuing, to buyers, lists of manufacturers in various lines who have agreed to certify to purchasers that material or articles supplied by them comply with approved Federal or commercial specifications. The scheme for proven compliance with specifications which is known as the Quality-Guaranteeing Labeling Plan serves to identify to the buyer or consumer both the firm or association issuing the guaranty and the nationally recognized specification which the commodity is guaranteed to meet. With an eye to the participation of plastics, it is only fair, though, to point out that this system is particularly adapted to the marketing of staple products rather than specialties.

Most plastics factors will bear witness that, viewed from the standpoint of the contract-buyer, one of the most burdensome obligations of the specification method of purchasing resides in the necessity for testing the commodities upon delivery. The certification plan is claimed to reduce this burden very materially in connection with commodities complying with nationally recognized specifications. Better yet, the self-identifying, quality-guaranteeing labeling plan is intended to practically eliminate the need for testing by over-the-counter buyers of mass-production commodities. Meanwhile, the specification-smoothing machinery essays to make things easy for outfitters not provided with their own proving plants. Purchasers, buying for their own consumption or buying for resale, are put in touch with the most convenient commercial testing and college research laboratories which stand ready to check up on deliveries to specification or to sample. The result is to send, say, plastics testing to the plants best qualified to verify composition and quality.

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INDEX OF MODERN PLASTICS ADVERTISERS

American-British Chemical Supplies, Inc. 53
American Catalin Corp. 1
American Insulator Corp. 69
American Plastics Corp. 63
American Record Corp. 59
Auburn Button Works, Inc. 57
Bakelite Corp. ..... Inside Back Cover
Barco Manufacturing Co. 55
Beetleware Corp. 10
Cambridge Instrument Co., Inc. 71
Cavagnaro, John J. 62
Celluloid Corp. 2
Chicago Molded Products Corp. 64
Claremont Waste Mfg. Co. 70
Colton Co., Arthur 56
Diemolding Corp. 61
Eagle Tool & Machine Co. 68
Fiberloid Corporation, The 8
French Oil Mill Machinery Co., The 67
General Electric Co. ..... Back Cover, 5
General Plastics, Inc. ..... Inside Front Cover
Gering, Inc., Larry 68
Gorton Machine Co., George 49
Heyden Chemical Corp. 56
Illinois Testing Laboratories, Inc. 63
Kessler Chemical Corp., The 59
Kuhn & Jacob Moulding & Tool Co. 66
Kurz-Kasch Co., The 65
Loomis, Evarts G. 64
Makalot Corporation 58
Marblette Corp., The 6–7
Monsanto Chemical Co. 53
Newark Die Co., Inc. 66
Northern Industrial Chemical Co. 71
Reichard-Coulston, Inc. 65
Resinox Corp. 45
Reynolds Spring Company 67
Richardson Co., The 4
Shaw Insulator Co. 60
Siebert, Rudolph R. 69
Siemon Co., The 70
Standard Tool Co. 61
Stokes Rubber Co., Jos. 51
Tennessee Eastman Corp. 43
Thomas Publishing Co. 62
Toledo Synthetic Products, Inc. 34–35
Waterbury Button Co. 47